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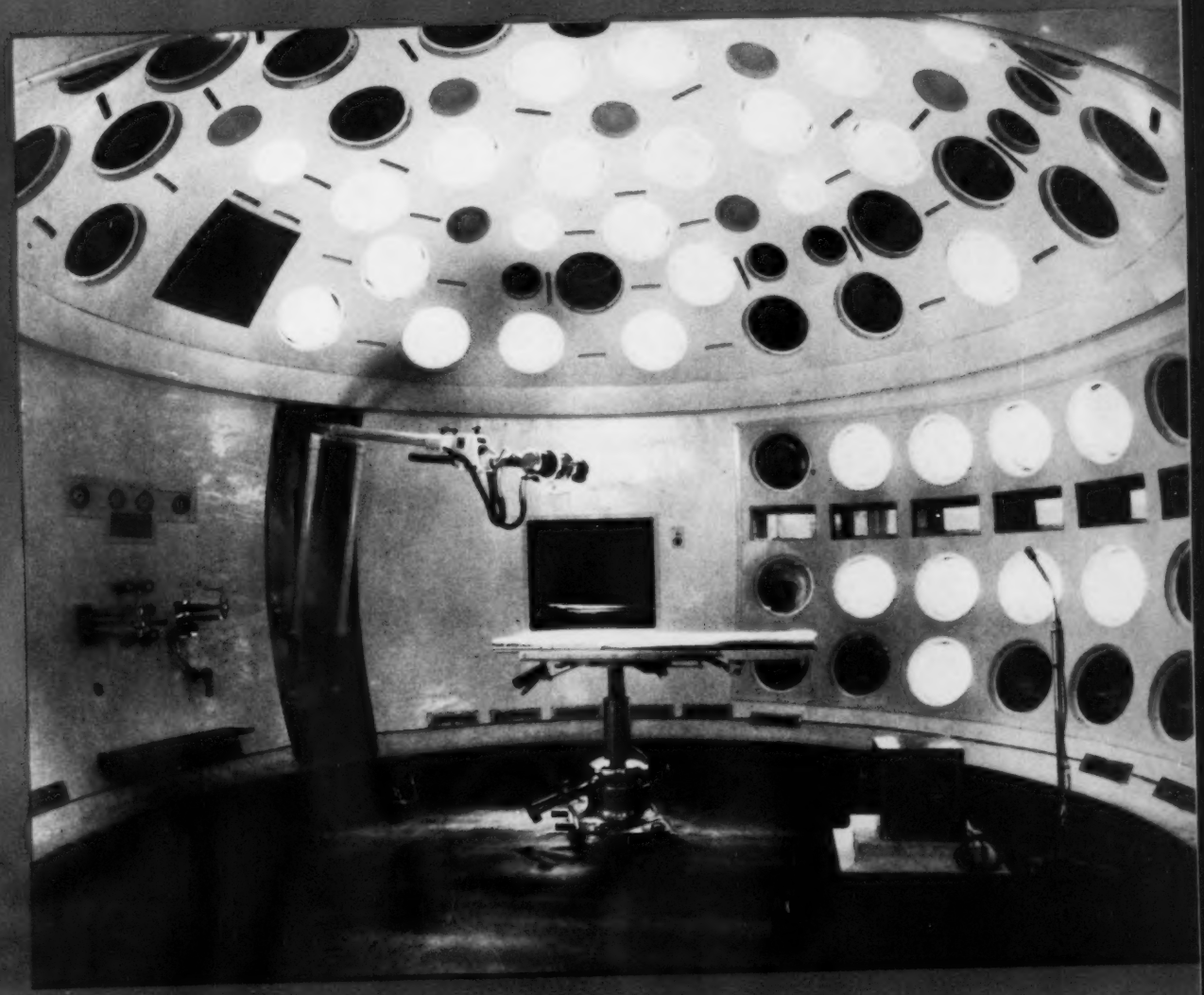
Light and Lighting

May 1960



In this egg-shaped operating theatre of the new Surgical Neurology Building of the Western General Hospital, Edinburgh (regional architect, John Holt, FRIBA), working light is from 47 porthole projectors. Normally only eight are used, giving 2,000 lm/ft^2 on the operating table.

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Consulting Engineers: E. A. Pearce & Partners
Electrical Contractors: Electrical Installations Ltd

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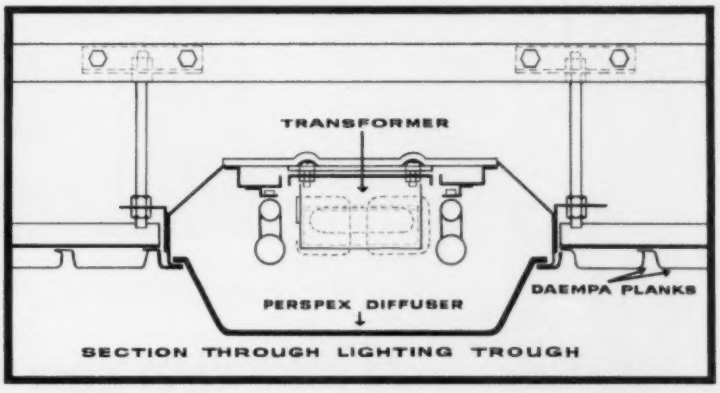
MAIN FEATURES

Entrance Hall	Embodies a fully illuminated suspended ceiling with cold cathode tubes.
Tower	'Floodlighting' by continuous green cold cathode tubes on each floor.
Lift Entrances	Laylights illuminated by cold cathode tubes.
Interior General Lighting	The DAEMPA Ceilings are fitted throughout with continuous trough cold cathode lighting and "Perspex" small diamond pattern diffusers.

The complete scheme used more than 4 miles of cold cathode fluorescent tubing!



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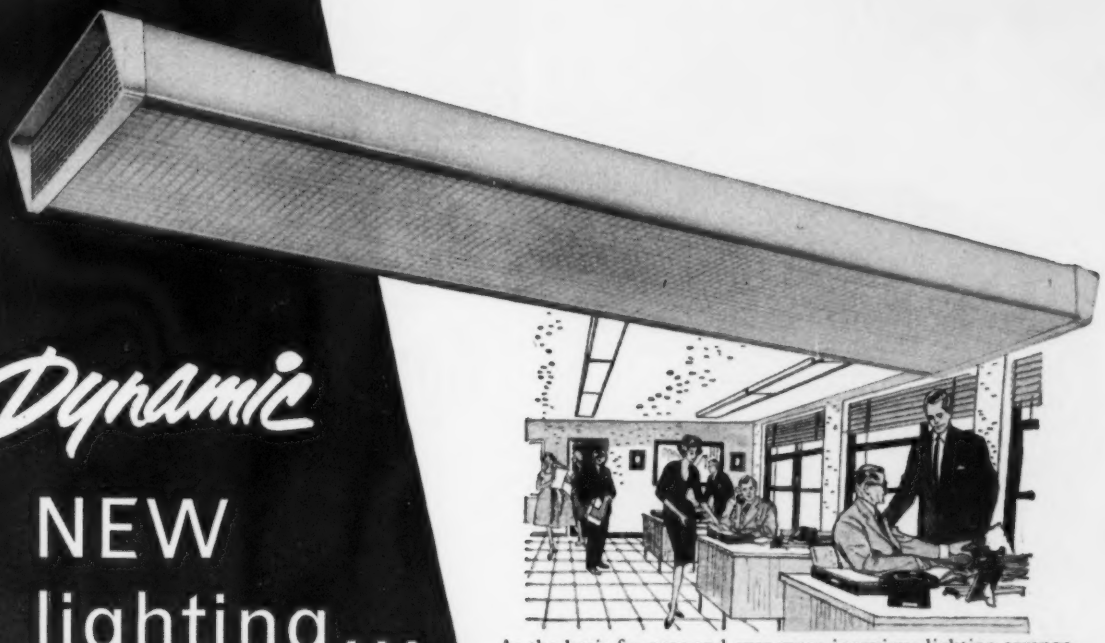

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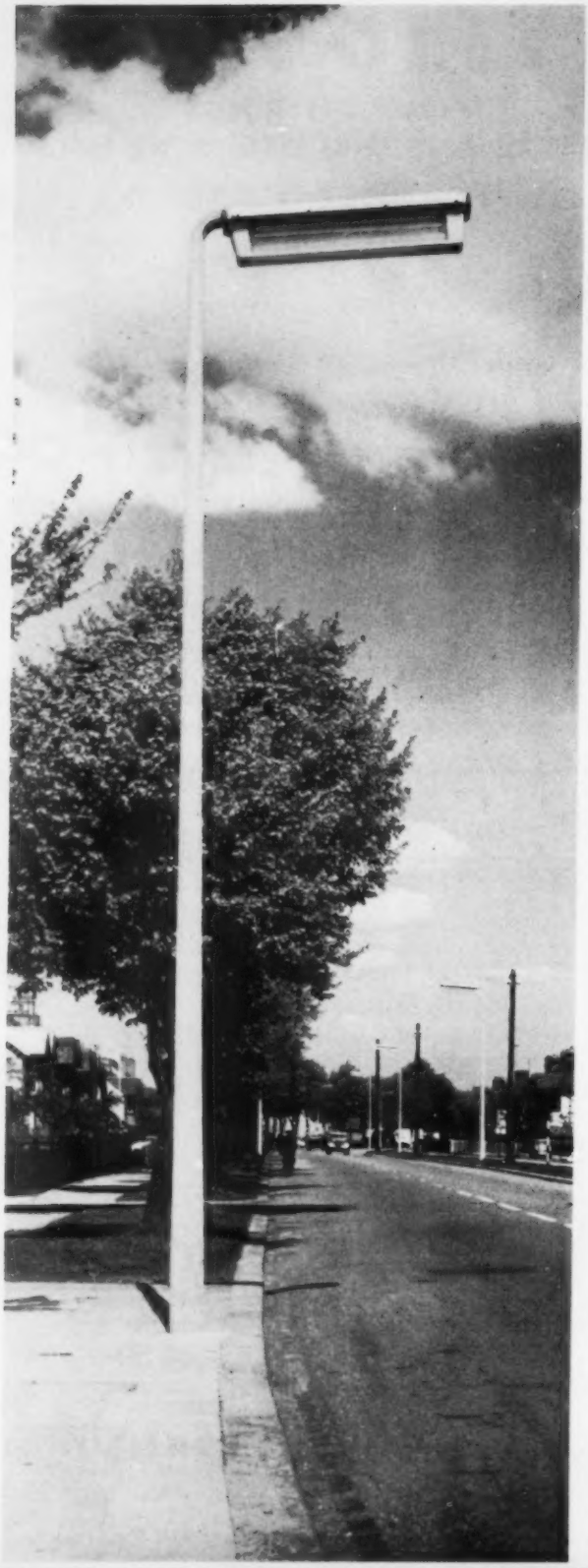

STANTON

Prestressed Spun Concrete Lighting Columns

Stanton Type 8K/1 Spun Concrete Lighting Columns fitted with G.E.C. Z.8484 Fluorescent Lanterns at Bedford.

Photograph by courtesy of F. W. Dawkes, Esq., B.Sc. (Eng.), A.M.I.C.E., M.I.Mun.E., A.M.T.P.I., Borough Engineer & Surveyor.

The type shown is one of many Stanton designs approved by the Council of Industrial Design and acceptable to the Ministry of Transport for use on trunk roads.

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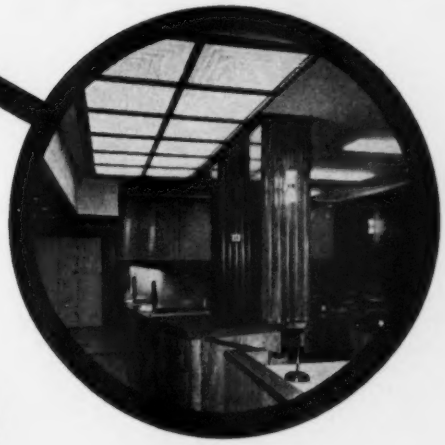

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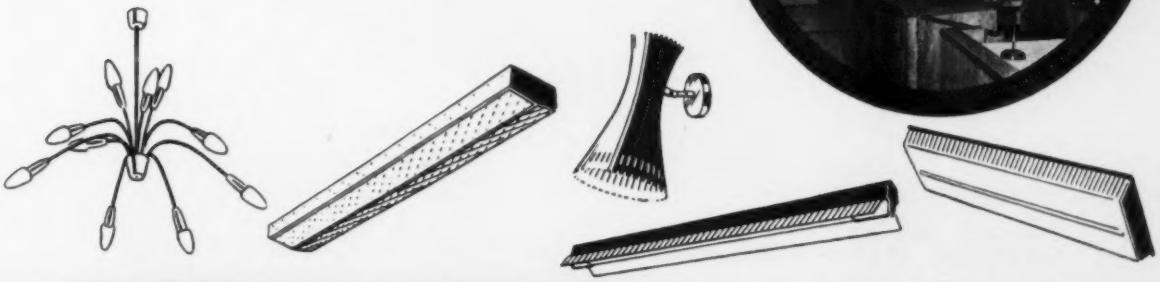

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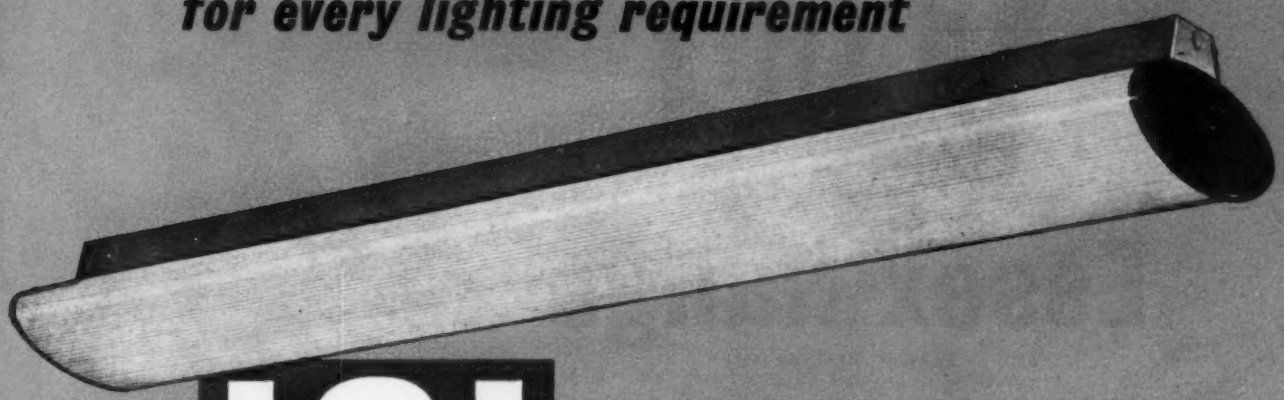

101 *range* *fluorescent* *lighting fittings*

The G.E.C. 101 range of fluorescent fittings offers a wide choice of designs for every lighting requirement. Employing the G.E.C. basic channel with its advantages of versatility and economy in installation and maintenance, they are used with 1¼ to 8 ft. single or twin Osram guaranteed tubes.

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for every lighting requirement

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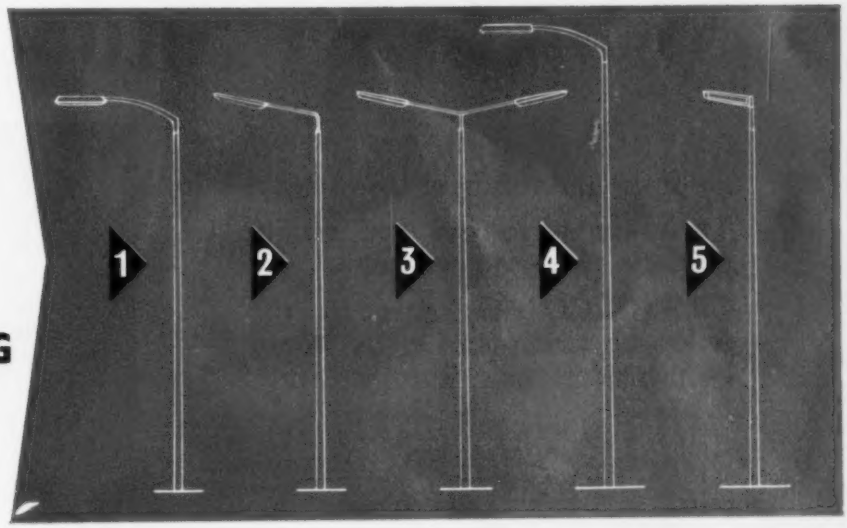
Designs illustrated below:—

1. 30′ M.H. with concrete bracket.
2. 30′ M.H. with tubular steel bracket.
3. 30′ M.H. with tubular steel twin arms.
4. 35′ M.H. with concrete bracket.
5. 30′ M.H. with post top fitting.

Left:— 35′ M.H. tubular steel bracket.

FOR 30 FT AND 35 FT MOUNTING HEIGHTS



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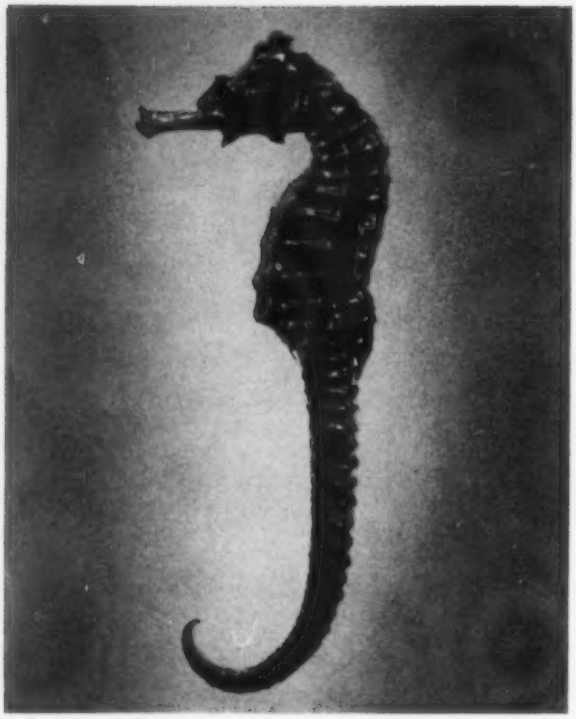

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Light and Lighting

Vol. 53 No. 5

CONTENTS

Published by The Lighting Press Limited, at 32 Victoria Street, London, SW1. Printed in England by the Shenval Press, Simson Shand Ltd, London, Hertford and Harlow.

Exhibition Lighting

THE ninth Electrical Engineers (ASEE) Exhibition held at Earl's Court last month was the largest yet organized and included the most comprehensive display of lamps, luminaires and other lighting equipment. Being what they are, exhibitions need lavish lighting and, in this case, many of the exhibits were self-lighted and also contributed to the stand lighting. A striking feature, that excited general admiration, was the world's largest electrolier. Created specially for the occasion, this was a thing of grace and beauty, well-proportioned to form the suspended centrepiece in the great hall. This lofty hall is, of course, permanently equipped with high-mounted powerful light sources for general lighting of the exhibition space. But the lighting of individual stands in any exhibition calls for imaginative design if it is to attract attention to the exhibitors' wares, to reveal them readily to the inquiring and potentially acquisitive visitors and to gratify the beholders. All of these are functions of the stand lighting—functions that were not equally well discharged at all stands. Exhibitors who were members of the lighting industry might be expected to be exemplary in the lighting of their stands. Some of them were and, by the nature of their exhibits, the stands of most of them were at least outshining. One of these exhibitors claimed 'eyeability' as a virtue of a particular product on show. We take this to be a somewhat ambiguous variant of 'eye appeal'. Be this as it may, exhibitions in general make their appeal to visitors essentially through the visual sense, to which their lighting should be pleasing as well as effective functionally.

Notes and News

AT A MEETING OF THE Education Discussion Circle of the Institution of Electrical Engineers, held in the Institution building on March 29, Mr G. F. Freeman opened a discussion on the place of illumination in electrical engineering. He pointed out that the subject included not only science and technology but a number of other things as well, notably art, architecture and what he described as 'a general sense of awareness'. This made it especially valuable as a broadening influence in the engineers' course. It should not, he said, be regarded as consisting of a little elementary photometry put into the syllabus in order to pay lip-service to the desirability of including 'something on illumination'. Instead, students should be encouraged to take an interest in modern light sources and in practical problems of lighting.

The meeting was well attended and a lively discussion continued for over an hour after Mr Freeman had spoken. A number of those who took part were members of the IES, but they had no monopoly of the floor. A prominent member of the Circle remarked that a stockbroker had been defined as a pawnbroker with imagination and Mr Freeman wanted them to think of an illuminating engineer as an electrical engineer with imagination. Several other speakers emphasized that lighting was much more than the intelligent application of rules, or even principles. For this very reason, perhaps, it was not an easy subject in which to examine.

There was some difference of opinion about the stage at which the student should be introduced to the subject. Some speakers thought that a start should be made in the second year of the Ordinary National Certificate, while others wished to see it deferred and treated more fully at a later stage. Inevitably the crowded state of the syllabus was mentioned several times. One speaker said that at Nottingham University there were plans to run a full course on illumination and this had excited considerable interest, not only in the engineering faculty but also among the psychologists and physiologists.

Education

IN THIS ISSUE WE PUBLISH a letter from Dr C. A. Padgham on education in illuminating engineering. This follows one on the subject which appeared in our March issue when a correspondent complained that the lighting industry neither encourages students to qualify nor rewards them when they do.

It is perhaps cold comfort for our first correspondent that Dr Padgham suggests he is well rid of a firm that puts no store on educational achievements but it is a fact, as he points out, that the great majority of firms do nothing at all about the training of lighting engineers and presumably hope that their present policy of piracy will fill all their future vacancies for qualified men. The gap in supply and demand is widening all the time and will take the longer to close the longer the present unsatisfactory state of affairs is allowed to continue. We do not foresee the situation where there will be scores of highly paid jobs for lighting engineers but we do see the need for a steady intake of qualified (Dip MIES) men who can design (and sell) lighting installations. The firms in the industry also know they are needed but unless they do something individually (not just relying on the bigger firms) to train young men and to offer them attractive salaries they may well find that the technical services of which they are so proud are no longer required; if architects and users find that the professional lighting advice they require is not available they will soon get into the habit of doing without.

It will be apparent from his letter that Dr Padgham has this matter of the education of lighting engineers very much at heart. Moreover he does not confine himself to new intake and readers will be interested to know that the Northampton College, London, in association with the IES is arranging an advanced course for qualified and practising lighting engineers on 'Recent developments in lighting techniques'. This course, of which further details will be given later, will be given on six consecutive Thursday evenings beginning on October 20 next.

Royal Institution Library

THE MANAGERS OF THE Royal Institution wish it to be known that the Institution's Library is open for purposes of study to persons who are not Members of the Institution. Admission to the Library is by means of Readers' Tickets, for which no charge is made. Holders of such tickets may use the Library for reference purposes only; they are not entitled to borrow books. Applications for Readers' Tickets should be made on a form obtainable from the Secretary. Applicants, who must be over 18 years of age, will need to be sponsored by a responsible person to whom he is personally known. Full details are included on the form of application. Information about the Library and its contents may be obtained from the Secretary or Librarian of the Royal Institution, 21 Albemarle Street, London, W1.

Prizes for safety ideas

MORE THAN £1,000 prize money is being offered by the National Safety Contest for ideas to cut down accidents in industry, on the roads and at home. The contest (which runs from April 25 to May 23) is being sponsored by thirty-five of Britain's leading companies. Every hour, day and

night, two people are killed, 352 seriously injured and many more slightly injured in accidents of some kind or another. Industry alone is losing something like twenty million man-days a year. If accidents could be reduced by only 10 per cent hundreds of millions of pounds would be saved. Entry forms can be obtained from the National Safety Contest, 36–38 Whitefriars Street, Fleet Street, EC4.

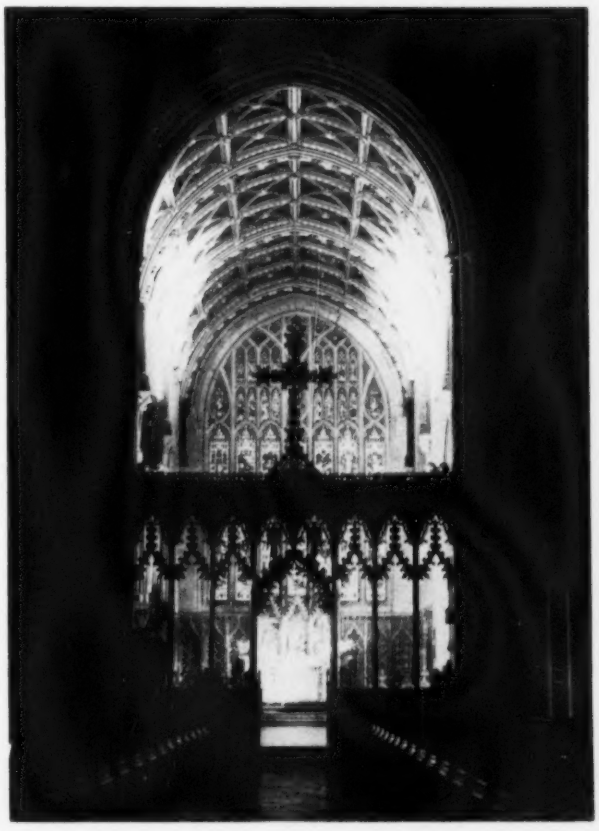
High level street lights

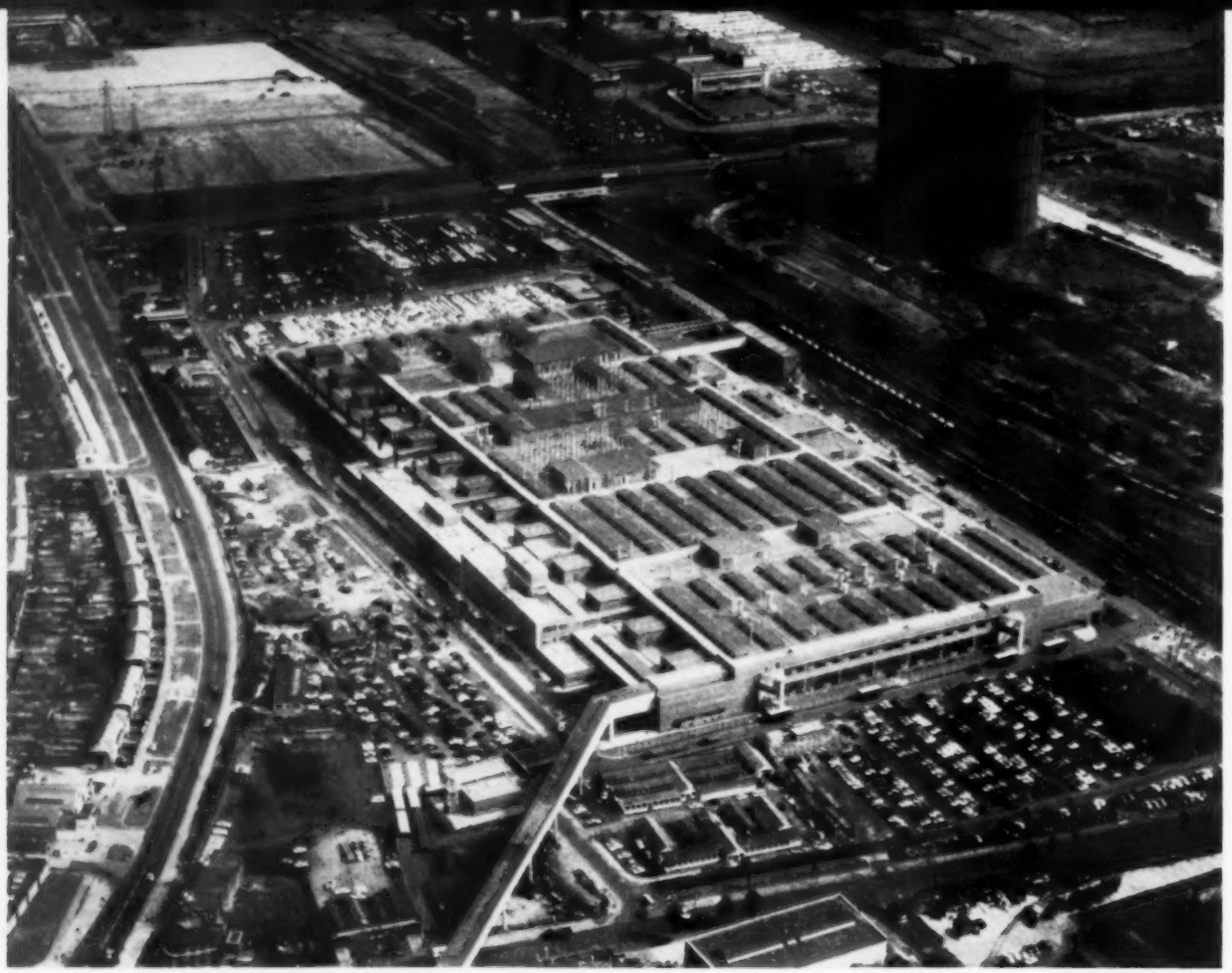
THE LONDON COUNTY COUNCIL recently staged an interesting exhibition of their development plans for the county and have published an attractive booklet, *New Sights of London* (price 2*s.* 6*d.*), both of which show the vast amount of new building work now being done and likely to be done in the future.

Our attention was attracted by a drawing, reproduced on this page, showing the plan for the famous Elephant and Castle junction. Noticing the shape of the new layout and the very high buildings to the north and south the thought crossed our mind that the whole junction might be lit at night by projectors on the tops of these buildings. A closer look showed that the artist had included lamp columns—we can count 22. One of the buildings appears to have 24 storeys and it would not seem impossible to light the junction without too much glare by means of projectors at such a height. We should be interested to hear of any objections to such a scheme but even should they prove to be insurmountable it would seem a pity to let such a chance for experiment slip by. Would any town planner and/or lighting engineer like to take up this exercise?

Son et Lumière in a church

ONE OF THE neatest and most skilful displays of light and sound that we have seen is that which has been arranged *inside* Croydon Parish Church as part of the millenary of the Borough of Croydon. This is a most unexpected application of the *son et lumière* technique and was devised by Christopher Ede for the children of Croydon who will be making a pilgrimage to the Parish Church during the millenary year. Entitled 'Here a Church' it is incorporated into a recorded service conducted by the vicar. The narrative, spoken mainly by Peggy Ashcroft and Godfrey Kenton, tells the story of the church over the past 1,000 years. The spectacle in the church takes place mainly behind the rood screen where a variety of incandescent and fluorescent fittings giving different coloured effects are concealed. The lighting, which was arranged by Atlas Lighting Ltd, is skilfully controlled and artistically used and the result is very dignified and impressive. Control is by the Atlas 'Aurama' system and is fully automatic from the Introduction by the vicar to the final benediction. Performances will be given to Croydon schoolchildren until the end of the year.





The new Paint, Trim and Assembly plant from the north-west

Ford Plant Extension at Dagenham

A description of the new plant and the lighting installations

By W. H. BROOKS ASSOC.I.EE.

In the manufacture of a motor-car, electricity for power and lighting, steam, water and compressed air play an important part, and the services required towards the production and amenities of the manufacturing plant are extensive. This article describes the problems and achievements associated with the completion of the new plant for the Ford Motor Co Ltd at Dagenham, the design and construction of which had many facets common to normal manufacturing processes as well as those pertinent to motor-car manufacture, not the least of which were the electric lighting requirements.

When the Ford Motor Co Ltd decided to extend their Dagenham Works to meet the ever-growing demand for motor-cars of normal horse power, a plant suitable for automation had to be designed. In order to meet the ultimate objective, various stages of development for the expansion programme had to be considered which meant going to the very core of the manufacturing processes.

THE FIRST NEW BUILDING to be considered was that for accommodating the various dies which are used for pressing the car body sections. This new building released areas hitherto occupied by dies and enabled an extension to be made to an existing Press Shop and the design and equipping of a complete new Press Shop to increase the output of car shells. Associated with these two projects was the necessity for a new tool room and the associated production engineering drawing office, and a re-modelling of the Body Shop, hitherto known as 'Body-in-White'.

The new Die Store building is 700 ft. long, 50 ft. wide and 43 ft. high and equipped with one 30-ton electric overhead travelling crane and one 50-ton overhead crane operating just below the truss level.

The lighting installed on the roof truss comprises high bay lighting fittings using 1,000 MB/V 400-volt lamps each fitting being provided with a 21-in. galvanized wire safety guard. The illumination level is 25 lm/ft.^{2} The method of control is by six contactors each operating three groups of three-lamp circuits from two remote push-button control panels. The circuits are divided over the three-phase supply and the illumination is such that the crane operators have full vision and definition when manipulating dies within the storage areas.

Press Shop

THE NEW PRESS SHOP (486 ft. long, 354 ft. wide and 50 ft. high) and the extension to the existing Press Shop are illuminated by blended mercury/tungsten high bay lighting units, each unit comprising a 400-watt mercury lamp and a 750-watt tungsten lamp, six such units being wired per circuit mounted 42 ft. above the floor and installed in rows 16 ft. apart, 20 ft. between fittings. The average illumination is 25 lm/ft.^{2} The circuits comprise three units and are controlled by push-button operated contactors similar to those in the Die Store. The total lighting load is 550 kVA. In the area beneath the presses, tungsten lighting in wall mounted bulkhead fittings are installed to light the aisles for the passage of fork-lift trucks and for the collection of off-cut metal from the presses. From the Press Shop the pressings are transferred to the Body Shop where they are welded together to form the car shell after which they are transported to the paint floor.

'Body-in-White' Plant

THE RE-MODELLING OF THE 'Body-in-White' plant necessitated the removal of part of the Body Plant building in advance of the rebuilding to allow one bay to be built, to permit the erection of the conveyor bridge which conveys the completed body shells to the Paint, Trim and Assembly building, and to maintain the flow of work during the reconstruction of the remainder of the 'Body-in-White' buildings without interfering with normal production. When completed, the 'Body-in-White' building will be on two floors, comprising six bays, each bay 150 ft. by 80 ft.

The lighting for Bay No. 2 (the first to be constructed) comprises twin 5-ft. fluorescent fittings mounted at 11 ft. 3 in. in eight rows of fifteen fittings spaced at 10 ft. 3 in. and giving an average illumination of 25 lm/ft.^{2} The ground floor is wired in a conduit system with twelve fittings per circuit, each circuit controlled by a contactor. The first floor lighting is similarly treated, but instead of a conduit system, adopts a small-section trunking which has been designed with easily accessible plug-in outlets and a simple method of supporting the fluorescent fitting. This system provides complete flexibility in the spacing of the fluorescent units since they can be varied at will to suit any change in the lighting requirements should it be found necessary to do so either when the plant has been installed or if there is any change in production method.

Paint, Trim and Final Assembly

THE ENGINEERING SERVICES required for the new Paint, Trim and Final Assembly plant had to be considered in relation to the adoption of new and up-to-date techniques in manufacture and for the employment of the various engineering services. The whole process of manufacture is one of movement from the handling of the first sheet of steel fed to the Press Shop to the final 'drive away' of the finished car. Great care had to be given in the design of the plant layout to provide for and co-ordinate all services to meet the requirements of manufacture as a whole.

The Paint, Trim and Final Assembly building, as the term implies, is the culmination of the production, where the steel body shells are cleaned, painted and fitted with the interior and exterior fixtures and provided with engine, transmission, wheels and tyres, etc., to form a complete vehicle. Each car is also tested under its own power ready for dispatch.

The Paint, Trim and Final Assembly building is of two storeys. The ground floor is 1,215 ft. long in an east/west direction and 630 ft. wide. On this floor the completion of the cars is carried out after receiving the painted bodies from the first floor through specially designed transfer conveyor 'body drops'. The first floor, which is devoted to the preparation for and painting of the body shells, is 1,080 ft. long and 405 ft. wide. Around this area and on the roof of the ground floor are located thirteen ventilation plant houses, and four substations. The air conditioning plants for the paint spray booths and the ventilation plant for the first floor are situated on the first floor roof. Along the north flank of the building is the Facilities Block which is 650 ft. long and 45 ft. wide. This building provides accommodation for the administrative staff, the medical centre and the canteens.

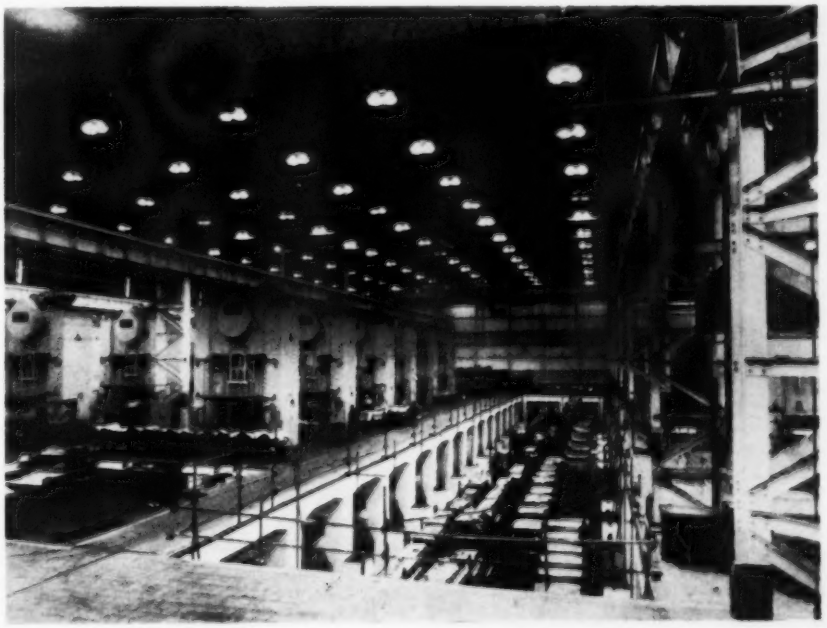
Communication between the Body Shop and the paint floor is by a bridge 725 ft. long which crosses Kent Avenue and accommodates the conveyor carrying the body shells to the paint floor, thus providing the link between the existing body factory and the new paint and trim factory.

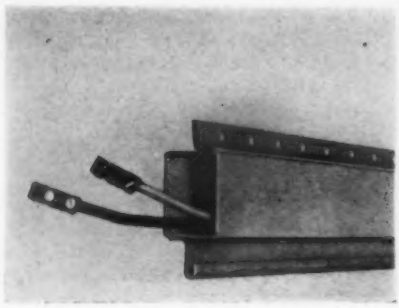
Electricity is derived from the main Ford Power House. Two 11 kV electricity feeders connect with the main substation on the south of the site and provides for a capacity of 21,000 kVA; the feeders are each connected to a 10,500 kVA reactor which in turn feeds the main 11 kV switchboard controlling the site electricity services and limits the rupturing capacity of the switchboard to 150 mVA.

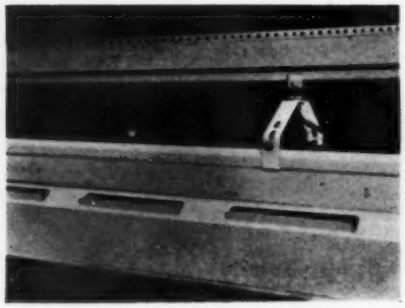
Lighting of the Paint, Trim and Final Assembly Building

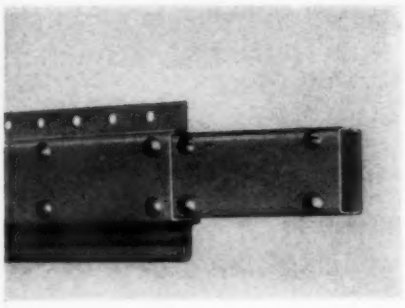
THE LIGHTING throughout the plant has been designed to provide the same average illumination over all working areas except on the ground floor, where the assembly of

The Press Shop





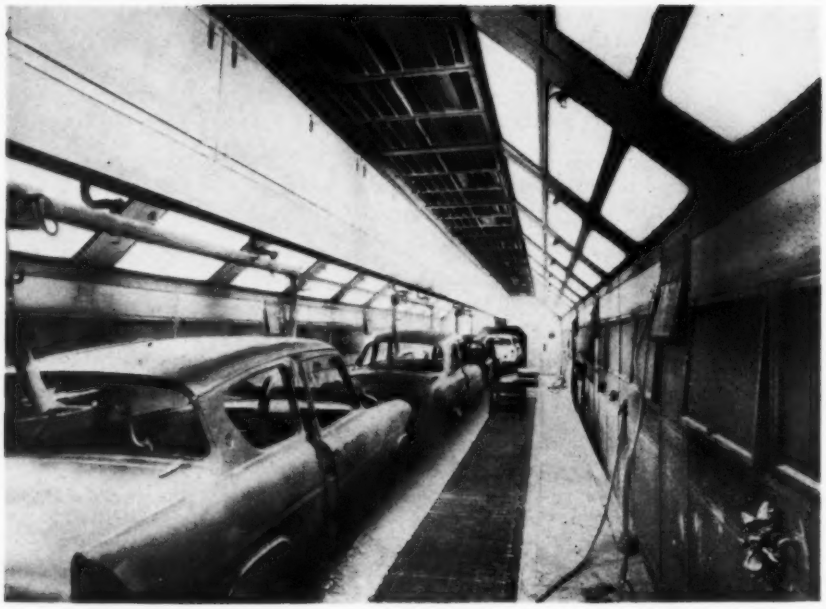


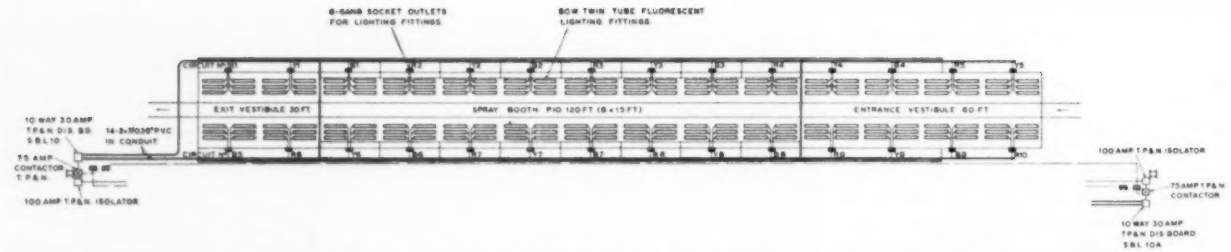


Above, the small-section duct used for quick installation, flexibility and ease of maintenance. Left, showing the half-U strip for supporting lighting fittings; centre, with fitting connected; right, showing connector piece

Right, a spray booth

Below, showing the arrangement of fittings in a spray booth





the car components is carried out, where high level lighting is supplemented by special lighting for the under-body conveyors and drive pits.

During the planning stage it was agreed that it was necessary to devise a lighting system which could be easily and quickly installed, which would provide flexibility to suit any future changes in floor layout, and allow for easy maintenance, lamp replacement and cleaning. Further, as there were many sub-contractors working on the various services it was very desirable that the lighting be connected and working as soon as possible to enable all trades to work within the main building programme.

To this end a small-section duct system was devised, the main features of which were a standard length to suit the building module of 11 ft. 3 in., a purpose made 13-amp. socket outlet (the fuse rating of the plug top being 3-amp.) fitted in each length of duct, a punched metal strip welded along the top edge of the duct to facilitate fixing by hangers from the building steelwork, and below the duct a welded half-U strip fixed the entire length for supporting the lighting fittings. Each standard length was wired and looped to the socket outlet and had special connector pockets at each end for end to end connection.

In each of the four quarters of the building lighting distribution centres have been installed from which sub-distributors serve local lighting fuseboard contactor control panels. From each of these panels circuits are extended in 6 in. by 4 in. sheet steel trunking to serve four 45-ft. square bays and to connect with the lighting duct supplying twenty lighting fittings grouped in five to a circuit and in five rows per bay. The lighting fittings are mounted 18 ft. above the floor and the installation is designed to give an illumination of 30 lm/ft.^{2} The rows of fittings along the final conveyor lines are fixed in the east/west direction (one bay wide the entire length of the north factory area) and in a north/south direction

over the crossfeed conveyors and garage areas.

The general lighting of the first floor is similarly installed except that the higher intensity is restricted to the main working aisles. Over the ovens, spray booths and other high level plant obstructions, the number of fittings per row of ducting is reduced.

Underbody lighting is provided by single tube fluorescent batten-type fittings fixed to the underside of the conveyor-supporting steelwork to give upward and downward lighting. These fittings are fitted with a 'Perspex' guard which is partially blacked out to avoid glare.

The high level light fittings are specially designed 5-ft. vitreous enamelled trough reflectors provided with special suspension to suit the half-U of the ducting. Each fitting is a complete unit which can easily be suspended on the ducting and connected to the supply. Replacement for maintenance purposes is simple as one man can remove any faulty fitting and fit a spare without difficulty. The underbody lighting fittings are also fitted with plug-in arrangements for similar ease of maintenance.

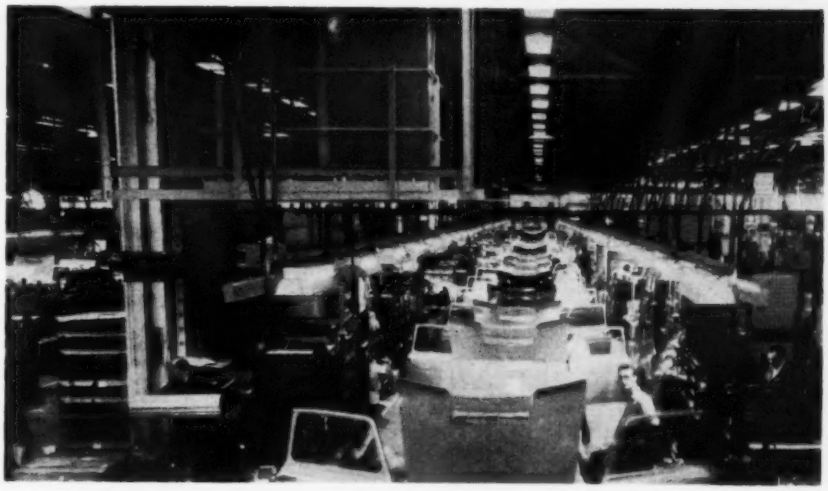
For the general lighting installation of the ground and first floors there are 156 lighting distribution units, 111,600 ft. of the special circuit ducting and over 11,000 lighting fittings. By having the ducting prefabricated, wired and delivered to the site ready for immediate erection and by arranging a delivery programme with the manufacturers of the lighting fittings it was possible to work at a rate of installation of 500 fittings per day.

For the Paint Spray Booths special high level illumination was called for. The same specification for the twin lighting fitting has been adopted. These are mounted in continuous lines behind wired glass panels set at 45 deg. angle in two sides of the roof of each spray booth in three lines of fittings per side. A completely shadowless illumination of the car bodies for spraying is achieved. The entire sequence of the spray booths extends over one mile.

The lighting of the Facilities Building was designed to be attractive in appearance as well as efficient. The fittings for the offices are installed in five specially designed troughs which form part of the false ceiling and extend the whole length of the office portion of the building. The lighting trough system permits changes in illumination levels without extensive rewiring; fittings can be spaced at the standard module or can be in a continuous line or at intervals as desired to suit office layout. The canteens are provided with the fitting which has been installed for the high level factory areas but are equipped with egg crate louvres. These installations are carried out in a conduit system, but the wiring and plug-in arrangement for the fittings is similar to that used in the factory area.

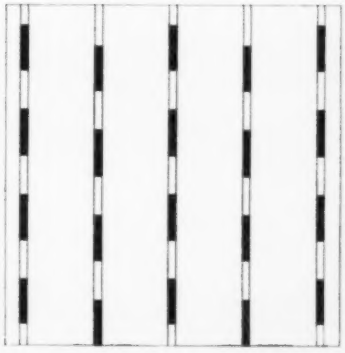
In the conference room a special illu-

Transfer of bodies by overhead conveyor from paint line to trim line



Above, one of the cross-feed trim lines showing low-mounted fittings supplementing high-mounted fittings

Below left, a typical 45 ft. sq. bay containing five runs of continuous trunking with 20 twin trough fittings mounted at 18 ft. giving an illumination of 30 lm/ft². Below right, the garage end of the ground floor of the PTA Building



Right, one of the final assembly lines

Centre, road-worthy test line where final adjustments are made

Below, a drawing office in the Facilities Building

minated ceiling has been installed comprising a jointless opal 'Perspex' panel behind which are mounted thirty-five 5-ft. 80-watt fluorescent tubes controlled by an electronic dimmer. This permits dimming of the whole of the ceiling lighting when films are shown. The lighting at full intensity gives between 35-40 lm ft.$^{-2}$ and can dim to complete black-out.

External Lighting

THE ONE-AND-A-HALF MILES of roads in the factory area are lit by 140-watt sodium lamp lanterns on 30-ft. concrete columns with 5-ft. bracket arms spaced at approximately 96 ft. along one side of the roadway. This lighting is controlled by photoelectric cell relays which operate on the changing of daylight intensity. For the car park areas 1,500-watt long-range floodlights mounted at 22 ft. are used.

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Floodlighting the tower of Liverpool Cathedral

During last year several notable floodlighting installations were arranged in different parts of the country in connection with the Golden Jubilee of The Illuminating Engineering Society. Unique amongst these installations was the lighting of the tower of Liverpool Cathedral—unique because in spite of the great size of the subject and the technical problems involved an outstanding result was achieved by the use of equipment that was readily made available from local resources. As the text that follows on the next two pages shows, this floodlighting was also an outstanding example of co-operative planning by those who appreciate the importance of lighting in the life of the community.

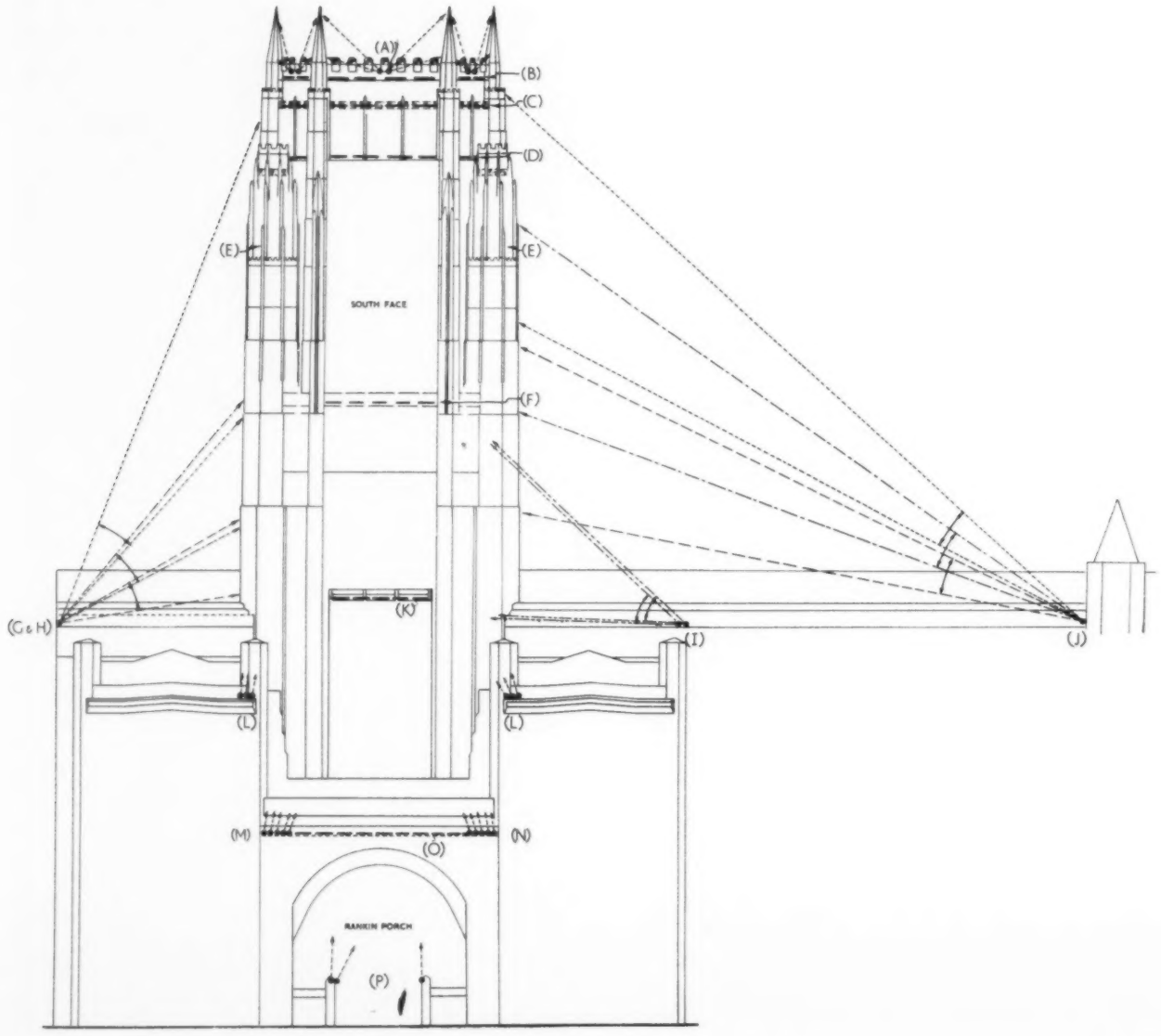
THE FLOODLIGHTING OF LIVERPOOL Cathedral, either completely or in part only, has been a dream for many years of all interested in lighting on Merseyside. When the Merseyside Electric Lighting Services Committee met to consider how support could be given to the Golden Jubilee celebrations of The Illuminating Engineering Society last year, it was a foregone conclusion that this would be suggested—as it was by Mr W. Gilchrist, Chief Commercial Officer of the Merseyside and North Wales Electricity Board.

Due to the great size of the building it had always been appreciated that any reasonable floodlighting scheme would require considerable resources but the MELS committee is a unique organization and through the variety of interests of its members has many facilities and a wide range of experience at its call. It was at a meeting in December 1957 that the original suggestion was made and after some preliminary surveys and discussions it was decided to concentrate on lighting the tower and a subcommittee consisting of Mr W. J. Forster, Mr G. L. Butler and Mr C. C. Smith was appointed to produce a scheme.

The loan of fittings, cable, lamps, fuses, accessories, etc., was arranged through the constituent members of the committee, i.e. the IES, BLC, electrical wholesalers, Electrical Contractors Association, the Electricity Board and the Liverpool Corporation. A scheme was prepared making use of such fittings as were readily available. It was at this stage that very real difficulties were encountered for, although the generous assistance of members had provided all the materials, equipment and transport that were needed, there would be a bill of about £750 for the labour necessary to install and dismantle the equipment. However, the Electricity Board and the Liverpool Corporation agreed to meet these costs and the way was then clear for the tower of the cathedral to be floodlit for the first time.

Due to the unusual and difficult nature of the ground in the immediate vicinity of the cathedral and to the limited funds available it was impossible to floodlight the tower from a distance and it was therefore necessary to mount the floodlights on the structure itself. Fortunately four 100-amp single-phase points were already available at or near the base of the tower for floodlighting purposes.

In siting fittings on the structure narrow offsets were unavoidable. This presented a number of problems particularly as the only fittings that could be used were those which could be borrowed. With such a high tower and narrow offsets it was obvious

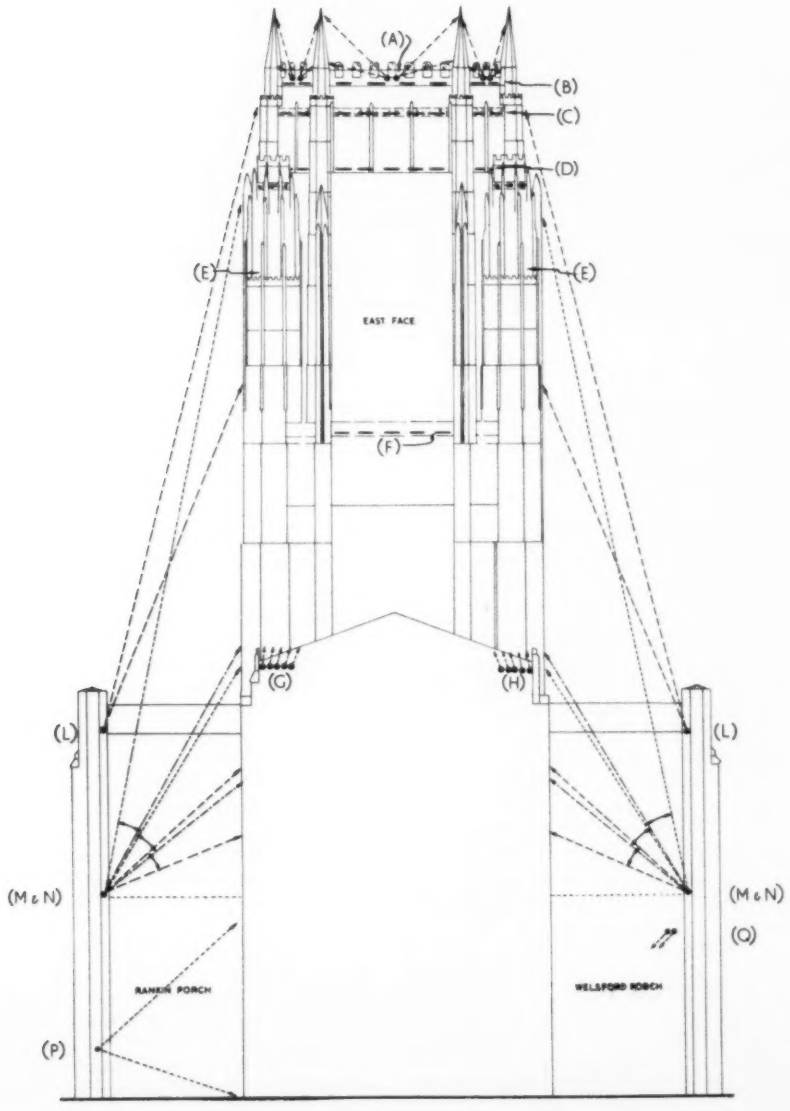


that the upper parts of the tower would be almost lost in shadow; it was therefore decided to rely on silhouette treatment for the upper parts and normal floodlighting for the lower parts.

The final scheme consisted of lighting the tower generally on the north and south faces with fittings sited on the roofs over the Welsford and Rankin porches, the offset being 40 ft., and on the east and west faces with fittings on the roofs of the choir and nave where the offsets were roughly 200 ft. and 75 ft. respectively. For the galleries and the top of the tower fluorescent fittings were used with medium angle GLS fittings for the pinnacles and sodium lamp units inside the turrets. The table and illustrations show the number and types of fittings used and their locations.

Fittings used in the scheme

SUBJECT	LAMP	FITTING BEAM ANGLE (DEGS.)	NO. OF FITTINGS	LOAD (kW)
Tower	1,500-watt GLS	23	20	30
	1,000-watt GLS	23	20	20
	1,000-watt GLS	20	12	12
Galleries	Twin 80-watt fluorescent	—	32	6·5
	Single 80-watt fluorescent	—	110	11
Turrets	140-watt sodium	—	12	2
Pinnacles	200-watt GLS	Medium	16	3
Porch interiors	500-watt B2	General dispersive	6	3
			228	87·5



Types of floodlights in each of the positions indicated on diagrams

(A) 16 200-watt GLS general dispersive
(B) 32 Twin 5 ft. fluorescent behind balustrade
(C) 28 Single 5 ft. ,, ,, ,,
(D) 28 ,, ,, ,, ,, ,,
(E) 3 140-watt sodium inside tower
(F) 5 Single 5 ft. fluorescent behind bal'trade
(G) 5 1,500-watt GLS, beam angle 23 deg.
(H) 5 1,000-watt ,, ,, ,, 20 ,,
(I) 2 500-watt ,, general dispersive
(J) 5 1,500-watt GLS, beam angle 23 deg., & 5 1,000-watt ,, ,, ,, 20 deg.
(K) 5 Single 5 ft. fluorescent behind balustrade
(L) 3 1,000-watt GLS, beam angle 20 deg.
(M) 5 1,500-watt ,, ,, ,, 23 deg.
(N) 5 1,000-watt ,, ,, ,, 20 deg.
(O) 10 Single 5 ft. fluorescent behind balustrade
(P) 3 500-watt GLS general dispersive
(Q) 3 ,, ,, ,, ,, ,,

Fig. 1

Manchester Sketchbook

By R. L. C. Tate

ONE of the pleasures of travelling is in savouring the atmosphere of unfamiliar cities and observing how their inhabitants solve familiar problems. This is a pleasure that can be enjoyed without going abroad, and a city which, to me, is particularly fascinating is Manchester. While stoutly denying that what Manchester thinks today London thinks tomorrow, I am quite prepared to admit that even a Londoner can learn something there, for Manchester is a city of importance—a provincial capital—with an atmosphere all her own. Capable of meeting London on equal terms, she doesn't ape the southern capital nor does she exaggerate the differences between the two cities. She is, therefore, free from the petty jealousies of less fortunate towns.

The accompanying sketches are the result of a walk around the main shopping streets of Manchester on a foggy January evening. The general standard of shop-lighting in Manchester is high but, as in other cities, most of it is rather conventional. There are, no doubt, some good installations that I failed to note, and a few of the things which seemed to me novel or exciting may be old news to some readers. If so, I apologize in advance, but I hope that the rest of this survey may prove of interest.

On the corner of Market Street and St Annes Square is Austin Reed's. Here two types of merchandise are displayed—suits and overcoats, and accessories such as hats, waistcoats, knitwear and shoes. Each class of goods requires a different window treatment, and the interesting thing here is the way in which the large plate-glass windows of the conventional shop-front have been broken up by a metal and wooden framework which also houses the fluorescent lamps. The illustration (Fig. 1) shows how effective it looks and my sketch shows (Fig. 2) how it was done. The reflectors housing the lamps form wide metal bands that relate to the cross-members bracing the 'Meccano'-like framework supporting the shelves. By this means a two-level display is achieved in which larger objects are displayed in the upper space, while small accessories, such as shoes, are shown at the lower level. It is interesting to note that the window curtains at first-floor level have been floodlit by sodium lamps—a technique that is familiar to Londoners but less commonly found in the provinces.

At the other end of Market Street, at Hope Brothers, the men's outfitters, fluorescent lighting equipment is mounted above 'Holophane' prismatic plates which take the place of the almost ubiquitous plastic louver panels. The effect is neat, but the ceiling is, perhaps, a little too bright.

Left, Fig. 4, 'Lumenated Ceiling' troffers at Barratt's are both unusual and effective, but are too vulnerable to damage by hooligans—see Fig. 5.

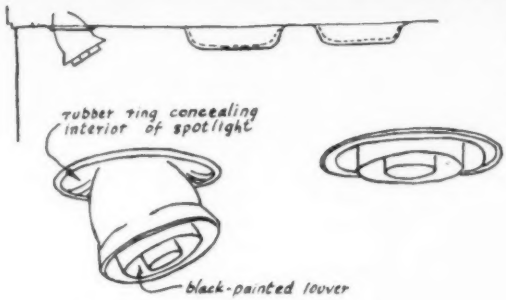
Particularly interesting are the swivelling spotlights, which can be pushed flat into soffit rings or pulled out and tilted to pick out special items of display. A soft rubber ring prevents the passer-by from seeing through the gap between the housing and the soffit-ring when the spotlight is pulled down (see Fig. 3). In a side window there are several small low-voltage reflector lamps recessed into the soffit, of which half were not lit at the time of my visit. It would be interesting to know whether this was due to poor maintenance or whether trouble has been experienced with the lampholders—a common fault with low-voltage equipment.

Wilful damage

An example of what I can only suppose to be wilful damage was to be seen at Barratt's shoe shop in Piccadilly. Here, a novel lighting effect has been achieved in the display lobby by carrying several troffers, covered with 'Lumenated Ceilings' corrugated plastic diffusers, down the walls at either side (see Fig. 4). The state of the PVC diffusers was nothing short of astonishing. They were so bady torn at their butted joints as to expose the lamps above, and I cannot believe that this could be the result of the wind or even of careless maintenance. It would appear that to install so fragile a diffuser within the reach of active and destructive youths is asking for trouble (see Fig. 5).

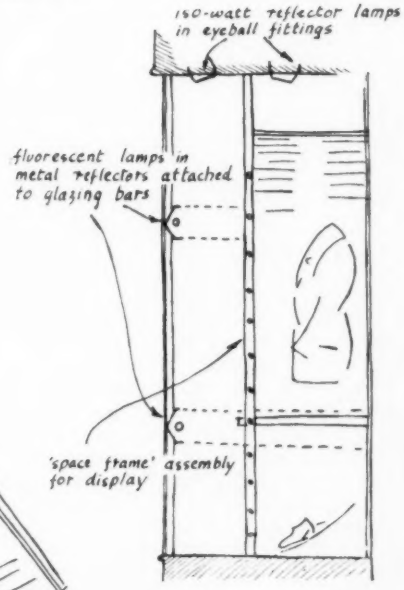
Rather an odd arrangement of lighting fittings is to be seen in the windows of Ryland's just around the corner. At the rear there is a row of louvered tungsten spotlights the purpose of which is rather obscure. Along the front of the window, however, there is a highly original arrangement of saucer domes into each of which a reflector housing an MBF or tungsten filament lamp is mounted (see Fig. 6).

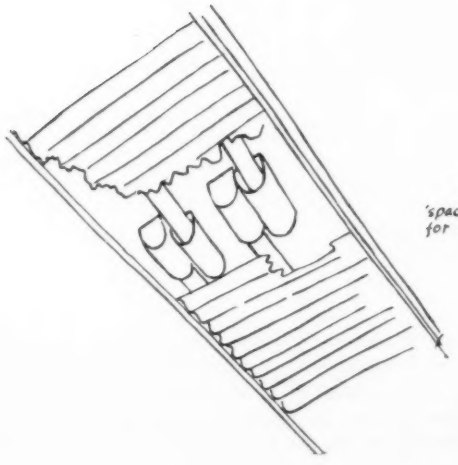
Two novel display effects—not wholly concerned with lighting—are the treatment of an open-backed window in Liberty's and a window backing at Jaeger's. The base of the Liberty window is well below pavement level, making a sort of well, with three black and white chequered steps on which small articles are displayed. This arrangement has made it possible for an extra line of fluorescent lamps to be installed at the foot of the window to supplement the top lighting (see Fig. 7), thus providing 'footlights' in an unusually unobtrusive manner. At Jaeger's, the low window backing is made of hessian-covered panels supported by black-laquered pillars that look as if they are made of 'three quarter conduit'. At the top of each



Left, Fig. 3, section through Hope Bros' window showing prismatic diffusers and spotlights, and sketches of the latter in extended and withdrawn positions.

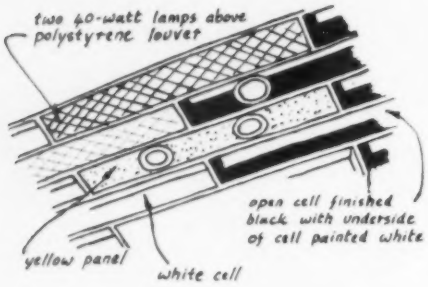
Right, Fig. 2, section through window at Austin Reed's. (See photograph on p. 128.)

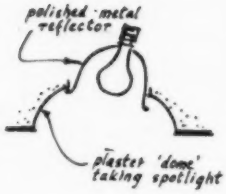




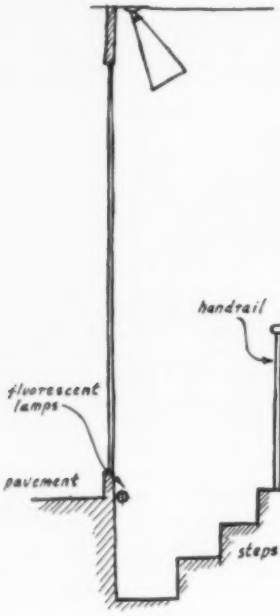
Left, Fig. 5, detail of troffer at Barratt's, showing damaged PVC diffuser. (See also Fig. 4.)

Below, Fig. 9, detail of Rotterdam ceiling at Marshall and Snelgrove's.

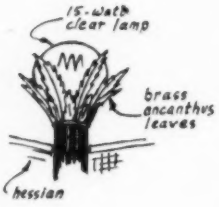


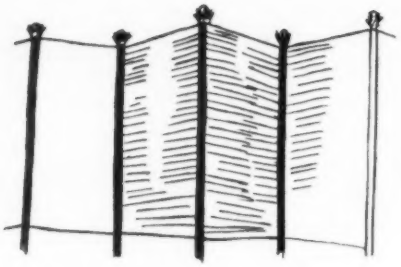


Above, Fig. 6, unusual recessing of a swivelling spotlamp in Ryland's window.



Left, Fig. 7, section through window at Liberty's, showing sunken window base and concealed 'footlights'.





Right, Fig. 8, low window backing at Jaeger's and detail of top of vertical support.

pillar there is a spray of brass leaves in which a low-wattage clear lamp nestles to provide an attractive point of light without drawing attention away from the merchandise (Fig. 8). I do not know whether this is a permanent feature of these windows or a temporary display 'gimmick'. In either case, I found it most effective.

On the other side of Police Street the back windows of Kendal Milne's soft-furnishings department are lit by fluorescent lamps above 'Paragrid-tile' louvers. The unusual feature of this installation is the deep step down at the back of the window to a luminous soffit forming part of the decorative treatment of the interior. The deep, white-painted 'riser' between the two soffit levels defines the limits of the window without impeding the view through it into the shop.

My next sketch—Fig. 9—shows an interesting variation on the Rotterdam ceiling technique at Marshall and Snelgrove's. Here, the alternative use of white and black paint on the insides of the rectangular cells of the ceiling makes a rhythmic pattern, partly broken up by cells containing fluorescent lamps above plastic louvers, by an occasional mustard yellow panel housing a filament lamp, and by a few black-painted cells containing filament lamps in louvered housings.

Finally, returning to St Annes Square, I saw some elegantly designed square fluorescent fittings in the Royal Insurance Building. Each fitting houses ten 80-watt lamps, with metal louver panels 'floated' inside a wooden framework. Though simple the effect is most pleasing, and this installation is typical of those that confirmed my belief that in Manchester—as in most cities—there is nearly always something to be found of interest to the lighting engineer.

Domestic Lighting

IN common with other organizations whose work influences the design and equipment of domestic premises, the British Lighting Council was invited to present evidence, a summary of which is given below, to the Housing Standards Sub-Committee of the Central Housing Advisory Committee of the Ministry of Housing and Local Government.

In its evidence the BLC stated that although the annual consumption of electricity for lighting had doubled since the end of the war, it is estimated that it is still only 350 units per household. This is very low, and in view of the greatly increased national realization of the benefits of good lighting and the growing tendency to regard it as a significantly important part of home furnishing, the main reason why more is not being used appears to be lack of the proper facilities for so doing. It is felt that the present-day importance of catering for personal expression must be recognized, and that this can only be achieved through concentrating development on the extension of the socket outlet system.

The British Lighting Council recommends that local planning authorities should revise their thinking on lighting, and require all new dwellings, whether built by the local authority or privately, to have an installation *at least* up to the standards recommended in Clauses 302 and 303 of the 1948 British Standard Code of Practice, and preferably to that proposed in Clause 305. The Council feels that the installation deficiencies in many existing homes must be recognized and remedied, and that only fully qualified and competent people should do the installation work required. It recommends that an adequate lighting installation be included amongst the 'standard amenities' for which the House Purchase and Housing Act empowers local authorities to give financial aid. It also recommends that all building societies should extend the facilities they grant for the improvement of older property to cover the modernization of the electrical installation. Today an adequate lighting installation should be regarded as an integral part of all dwellings. Without the convenience it provides, any household is handicapped in innumerable ways. At present only about 1 per cent of total building cost is allowed for the lighting. This figure should be increased to about 3 per cent, and electrical installations should be designed to cater for adequate lighting requirements for many years ahead.

Fig. 1. Part of the entrance hall in the new Paris Lighting Centre.

A Lighting Centre in Paris

PARIS HAS OFTEN BEEN DESCRIBED as the 'City of Light' and it is, therefore, only fitting that the visitor should find there a Lighting Centre which, as will be seen from the photographs reproduced on this and the following pages, is both imaginative in conception and lavish in execution. This Centre, recently opened at No. 29 Rue de Lisbonne, is on two floors. In the entrance hall, shown in Fig. 1, the architectural features and the colour of the lighting have been carefully designed to create a charming milieu, with flowers and growing plants to add to the general effect of harmony and well-being.

The lighting in the entrance hall is semi-indirect from fluorescent lamps housed in hollow wooden beams of tri-

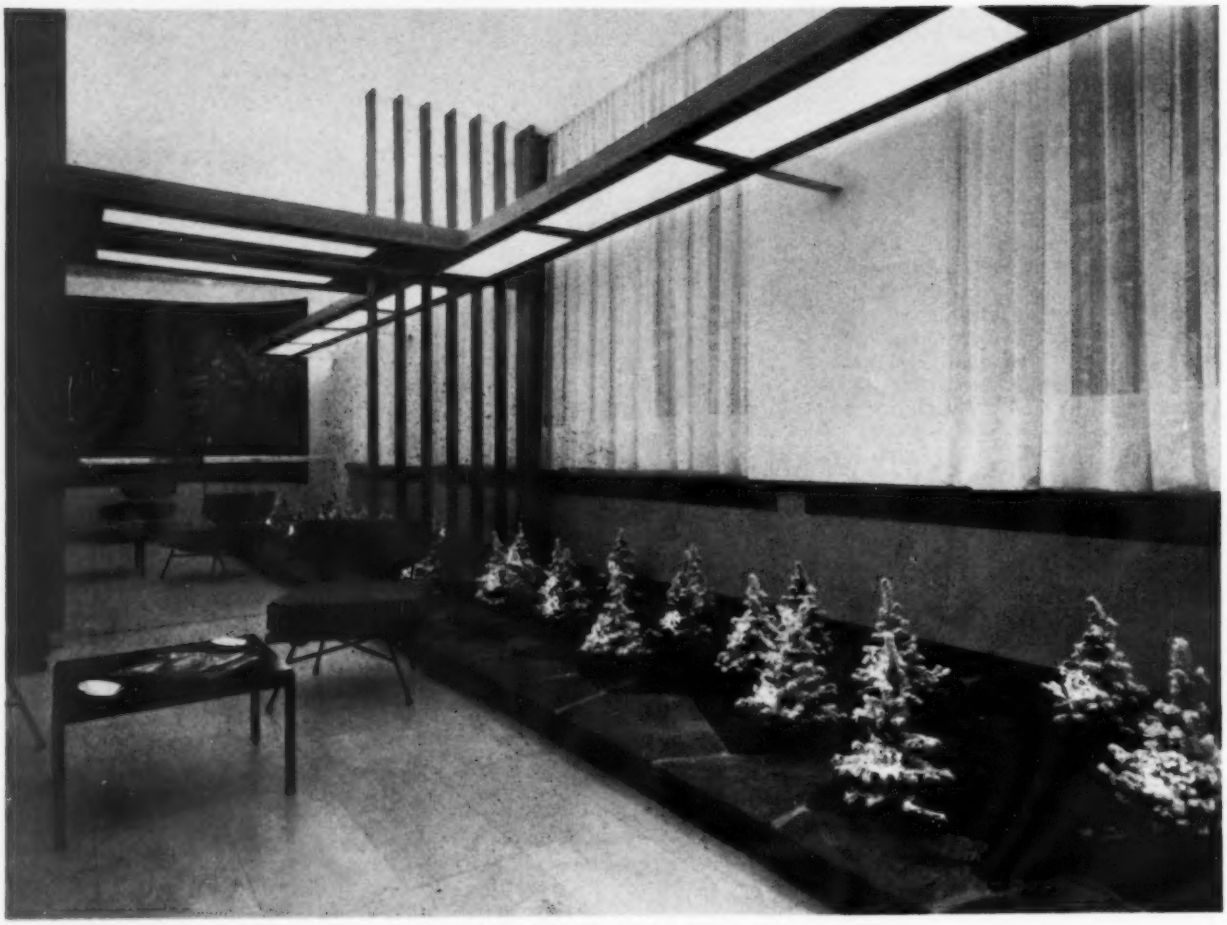


Fig. 2 (above), another part of the entrance hall. In addition to the indirect lighting there is a warmer direct component provided by reflector lamps in the ceiling. Fig. 3 (below left), the demonstration shop window opposite the bottom of the stairway. In the ceiling are small projector lamps behind lenses. These give a uniform circular patch of light on the floor, not visible in the photograph. Fig. 4 (below right), the luminous wall of flowering plants.

Fig. 5 (above), the foyer where an attempt has been made to create an impression of airiness and lightness. Fig. 6 (below), the conference room with an illumination which can be varied from 0·3 to 40 lm ft². All the equipment can be controlled from a desk at the back of the room.

angular section. These are prevented from appearing too heavily contrasted with their background by the provision of a number of narrow glass covered apertures giving some degree of sparkle. The rectangular pillar behind the desk where the receptionists are seated consists of a pile of slate slabs, with openings for small coloured glass windows.

In showcases at the rear of the entrance hall there are exhibits illustrating the development of the electric lamp and serving to remind the visitor how this has been brought about as the result of a long chain of scientific research and discovery.

In another part of the hall fluorescent lamps are housed in shallow trough fittings with diffusing glass panels below (Fig. 2). At the top of the staircase leading to the sub-ground floor is a tapestry by Picart Le Doux; this is given emphasis by a projector lamp mounted on one extremity of the trough fitting.

Descending the staircase the visitor sees in front of him a demonstration shop-window (Fig. 3) so designed that the use of light in different ways to show off a window display can be effectively demonstrated; the decor and lighting effects combine to create an unmistakable 'Bond Street' atmosphere. On the right is a wall (Fig. 4) of diffusing plastic illuminated from behind by fluorescent lamps to silhouette racks of flowering plants in front of the wall.

In another part of the sub-ground floor an uninterrupted luminous ceiling is carried over and down to the bottom of one wall (Fig. 5). The de luxe daylight fluorescent lamps behind the plastic ceiling and walls give a general illumination of about 150 lm ft², while supplementary lighting is provided in the showcases which contain specimens of lamps of many different types. There is also a smaller showcase with four cubicles in which the colour-rendering properties of four different kinds of lamps are demonstrated.

From this foyer the visitor passes through a long communicating lobby lined on both sides with model demonstration rooms showing offices, factories, shops, living rooms and the like, each with an appropriate system of lighting. This lobby leads into what is, perhaps, the focus of the whole Centre, the Conference Room (Fig. 6). Here lectures are given and the principles of good lighting are explained and demonstrated. That half of the auditorium nearer the stage is lighted by means of a luminous ceiling, the brightness of which can be varied by electronic controllers operating on the fluorescent lamps. The seats are upholstered in an attractive blue which, with the red carpet, the light beige curtains and light grey walls, provides a pleasing colour scheme under the light of the warm white fluorescent lamps. Leading out of the conference hall is a smaller room housing a series of demonstrations of the effect of lighting on the perception of form, contrast, colour and texture.

This Lighting Centre, due to the energy and initiative of M. Alfred Monnier, appears as a hopeful augury to those who would like to see the establishment of a French Institute of Light. It has been created by a team of architects, decorative artists and lighting engineers who have laboured together with the aim of showing 'light' as a noble and beautiful conception. The Centre is open to all and visitors are taken round by a guide who provides a commentary on what they see and is glad to discuss any lighting problem they may care to raise. Lectures are provided for professional groups, technical schools and the like. As Jean Chappat writes in *Lux*, 'We are confident that everyone who visits it will go away convinced that light is not only a factor in human comfort but a source of joy and happiness.'

LTE Depot, Upminster

LONDON TRANSPORT'S new railway depot at Upminster is the first completely new depot to be built for the 'Underground' since the war. It has cost £1 million to build and will take 34 eight-car trains. Among its special features is a control tower, fitted with talk-back apparatus, which enables instructions to be given from the tower to drivers through track-side loudspeakers that are heard by the driver concerned and no one else. Microphones enable the driver to reply, using ordinary levels of speech. In addition, there is complete control of all points by thumb switches in the control tower, and there are two train-washing machines of a new type. Associated with the opening of the depot, a new 'push-button' signal cabin was brought into use at Upminster Station. The depot has been in use for day-to-day cleaning and maintenance of trains since December 1958, but only since the completion of the new 215-ft. lifting shop has it been possible for full maintenance work to be undertaken.

The new depot, which is the only Underground depot on the east side of London serving the District Line, replaces inadequate facilities provided previously mainly at East Ham Depot, the site of which has been acquired by the Eastern Region of British Railways in connection with its own modernization programme. It has taken, for all stages, over 3½ years to complete and comprises three reception roads, leading to thirteen sidings capable of taking twenty-five trains; a car shed with nine roads; a lifting shop with two roads; and three permanent-way sidings.

The car examination shed, which is 450 ft. long, consists of nine roads—eight of full length capable of taking an eight-car

Top of page, general view of depot at night as seen from lighting tower at west end. Car examination shed is on extreme left, with lifting shop adjacent to it and second lighting tower in background. Left, 150-ft. lighting tower at east end of depot, carrying twenty-one 1,000-watt floodlights. Note fittings at base of tower for local lighting.

train completely over the pits provided, and a short pitted road taking three cars. As the work at Upminster is mainly cleaning and examination and not detailed inspection of equipment, one pit road only is provided with side pits. These side pits are used when detailed equipment examination is necessary, though this work is normally undertaken at the main depot at Ealing Common.

Overhead conductors, carrying small trolleys with jumper cables to provide power to trains, run the full length of the pits, as there are no conductor rails inside the car shed. The connectors on the jumper cables are inserted into receptacle boxes on the cars when power is required, this being the standard practice at all London Transport depots. The shed is provided with pit heating—an innovation at rolling stock depots—and at its single end power-operated shutters are fitted so that heat loss is reduced to a minimum when trains have to enter or leave the shed.

The lifting shop, adjoining the examination shed, is 215 ft. long. It was brought into use in June 1959, when, for the first time, accommodation for the lifting of cars became available at the eastern end of the District Line, thus avoiding the necessity of taking defective empty trains back to the main depot at Ealing. Although the general arrangement of the depot is single-ended, provision has been made for the lifting shop to be double-ended so that any one of the four cars which can be lifted can be extracted from the shop without interfering with work in progress on the other three cars.

The shop has two roads with centre pits running their full length. Each road is long enough to contain two cars with both bogies of each car out and still give space to work on them, the cars being lifted by an overhead 15-ton travelling crane. Fitters' benches and machines for repair of components are housed in a machine shop bay; a small sub-store for small components is also provided, and offices, mess rooms, locker room, lavatories, etc.,

Car examination shed: above, by night; below, by day. It is lit by 220 fittings, each housing a 5-ft. 80-watt fluorescent lamp, giving 8 lm/ft² at floor level. Daylight is from transverse rooflights.

are in a long line on the south side of the car shed forming the southern side of this building.

The main buildings are heated by oil-fired thermostatically-controlled boilers in a boiler room at the east end of the depot. In the car shed, only the pits are heated, but in the lifting shop hot water radiator panels are provided along the walls at low level and there are radiant heating panels suspended from the roof.

The car shed and lifting shop are steel-framed buildings, with continuous patent glazing to the sides and ends of the main sheds and asbestos-cement sheeting above—insulated in the lifting shop but not in the car shed. The use of continuous patent glazing is a departure from the practice at other depots, where walls are solid brick with steel sashes. The roof of the car shed is clad in asbestos-cement sheeting at a 4 deg. pitch, with rooflights of patent glazing units. Gutters are of asbestos-cement and are lined with roofing felt and asbestos tiles to serve as walkways for roof maintenance. The roof is a departure from those at other London Transport railway depots in that it has single tubular-steel trusses across its entire 150-ft. width, with two intermediate supports, instead of three separate trusses with valley gutters. The rooflights also span across the width of the building instead of running longitudinally, having felt-covered timber walkways for maintenance purposes on all sides. Longitudinal mansard glazing is provided at eaves level at each side.

The lifting shop roof also has tubular steel trusses in one (52 ft.) span, but it has a longitudinal ridge-light, with adjustable opening sections and a walkway all round. In addition, there is mansard glazing.

Lighting

Artificial lighting in the 298 ft. by 56 ft. lifting shop is from pairs of fittings housing respectively one 250-watt mercury lamp and one 750-watt tungsten lamp. There are sixteen pairs of fittings in two rows of eight, with 28 ft. between the fittings and 20 ft. between the two rows. The mounting height is 27 ft. and the illumination level, 20 lm/ft.^{2} at floor level. High-wattage units were chosen to minimize the number of fittings, as roof space for them was limited, the space being occupied also by the overhead crane and the radiant heating panels.

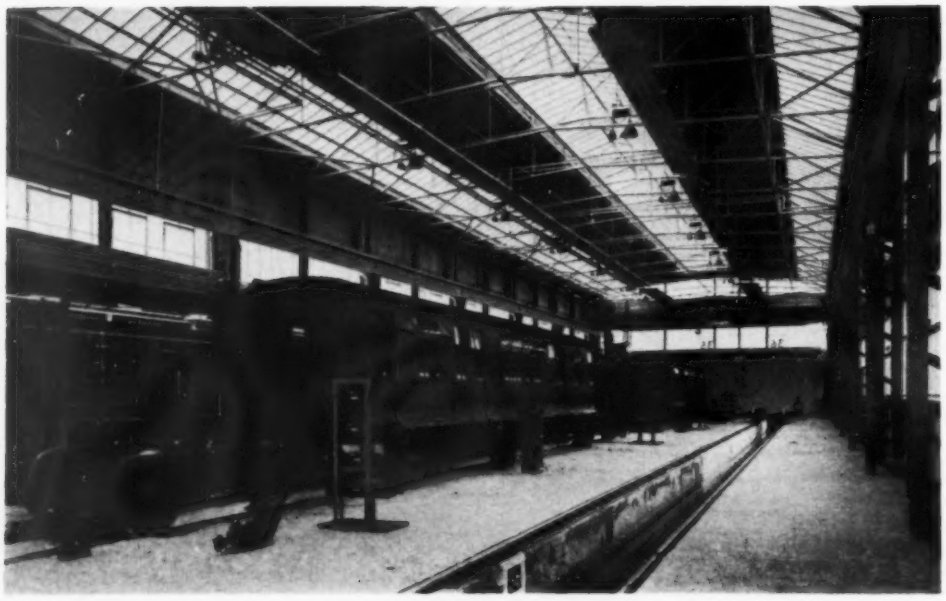
In the car examination shed, which is 456 ft. long and 128 ft. wide, there are 220 fittings each housing a 5-ft. 80-watt fluorescent lamp. Mounted in ten rows of twenty-two, the fittings—of the industrial trough type—are fixed to continuous trunking attached to the roof trusses. The rows of fittings are 16 ft. apart; in each row the fittings are at 20-ft. centres; and the mounting height is 17 ft. 6 in. The illumination level is 8 lm/ft.^{2} at floor level, and the reason for the choice of lighting method was the requirement that there should be a row of fittings between each of the nine tracks, as well as the need for evenly distributed illumination.

Lighting of the outside tracks of the depot is from two 150-ft. lighting towers, one at each end of the fan of sidings. The tower at the east end carries ten 1,000-watt floodlights, while the tower at the west end carries twenty-one. Except for some small areas, notably at the bottom of the towers, which are covered by local lighting units, these towers provide all the lighting necessary for the outdoor working of the depot. They provide an illumination level of 0·15 lm/ft.^{2}, the lighting being comparatively even and free from glare.

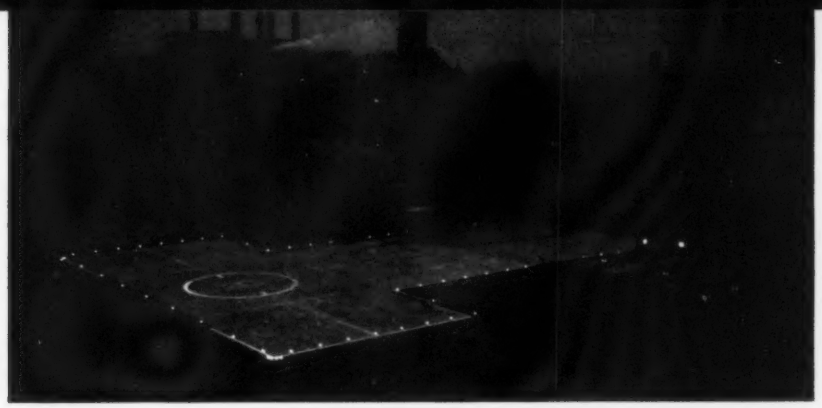
Lighting in the offices is from fluorescent fittings, while fluorescent lanterns mounted on steel masts light the roadways around the depot buildings and the walkway from the depot to the station.

Electrical supplies for lighting, heating and other a.c. services are from an 11-kV, 415-V, 500-kVa oil-cooled outdoor transformer, and are distributed from an auxiliary switchboard via hand-operated, fused-switch isolators.

The depot was built to the requirements of A. W. Manser, Chief Mechanical Engineer (Railways), London Transport. Civil engineering, signalling, lighting and heating were planned under the direction of C. E. Dunton, Chief Civil Engineer, while architectural work was under the supervision of T. R. Bilbow, FRIBA, Architect to the London Transport Executive. Main contractors for civil engineering work, Holland & Hannen and Cubitts Ltd; main contractors for building work, Tersons Ltd; patent glazing, British Challenge Glazing Co; lighting installation, Troughton & Young Ltd; lighting fittings, AEI Lamp & Lighting Co Ltd; lighting towers, Pirelli-General Cable Works Ltd.



Left, lifting shop, showing work in progress on two cars. Lighting is from tungsten and mercury lamps in two rows each of eight fittings. Mounted 17 ft. 6 in. above floor level they give 20 lm/ft^2. Note the radiant heating panels suspended from the tubular-steel roof trusses and the continuous glazing in side and end walls.



Night Flying at Battersea Heliport

BATTERSEA HELIPORT is a private venture, provided by Westland Aircraft Ltd, at a cost of about £60,000 to assist the development of the helicopter's civil applications and particularly to stimulate the use of helicopters in the London area. Although the heliport is neither large enough nor near enough to the city centre to become a permanent terminal, it is providing valuable experience of the problems to be expected when operating helicopters in and out of a city or heavily built-up area.

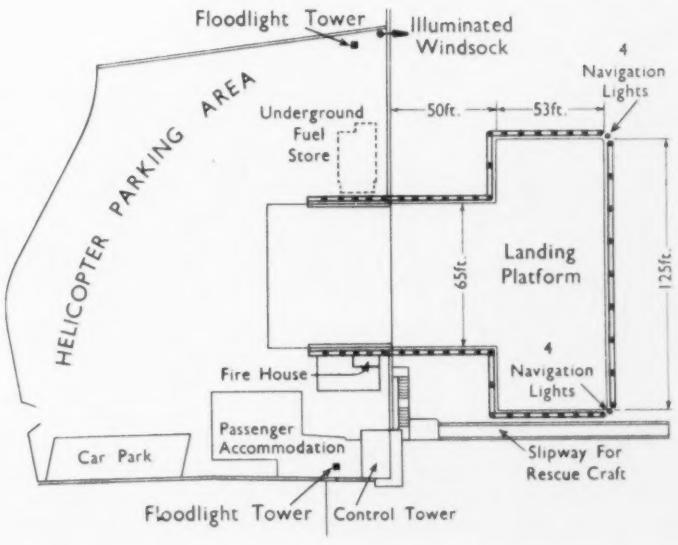
To increase the heliport's capacity, and to make better use of the short winter days, night-flying facilities were necessary. Following satisfactory trials with experimental lighting—and permission from the Port of London Authority—a permanent lighting system has now been installed using equipment supplied by the GEC Ltd and at a cost of about £1,700.

The lighting consists of medium-intensity elevated perimeter lights—to show pilots the boundaries of the landing platform—and floodlights mounted on towers to make the platform stand out against its surroundings, particularly the river which would otherwise appear 'bottomless' at night. By giving texture to the concrete platform, the floodlights help pilots to judge their relative height on the final approach. Unlike a fixed-wing aircraft, which passes over an airport's approach lights, the helicopter has to land among these lights, which become progressively brighter as the helicopter nears the ground. To prevent pilots from being dazzled, the heliport lights can be dimmed during the final stages of an approach.

The landing platform at the heliport is 125 ft. long × 53 ft. wide, connected to the river bank by a 65 ft. wide × 50 ft. long taxi strip, the two parts forming a 'T'. Surrounding the platform and about 12 in. below its surface are timber fenders. Perimeter lights have been mounted on these fenders and are spaced nominally 15 ft. apart along the 125 ft. edge and 7 ft. apart at the two 53 ft. ends of the platform. This type of light is a modified version of the GEC ZA.205 medium-intensity elevated runway light and is fitted with a 6-volt 36-watt lamp which, in conjunction with a one-piece pressed glass refractor, gives a maximum intensity in all directions of about 280 candelas. Each light is mounted on a weatherproof base and connected to the circuit by a watertight two-pole moulded rubber plug, an arrangement that simplifies maintenance and replacement.

Flanking both sides of the taxi strip are specially designed flame-proof taxi lights, spaced 7 ft. apart. Flame-proof fittings are used because the taxi strip passes close by two underground aviation fuel storage tanks.

On either side of the parking area is a 40 ft. tower with four 1 kW apron floodlights: two for illuminating the landing platform and two trained on the parking areas. Only one tower is used at a time, corresponding to the direction of approaching helicopters. These lights give an even illumination of 0·5 lm/ft² on the platform, a level which neither causes uncomfortable glare for pilots nor casts shadows along the landing area.



LIGHTING INSTALLATIONS

Above, branch library at Harrow Green, Leyton, opened recently, though work on the building—interrupted by the war and by post-war economies—started in 1939. Occupying a valuable corner site in a shopping area, the library is on the first floor of the building, the ground floor being occupied by shops. Seen in the photograph is the adult lending department lit by a 1,000 sq. ft. luminous ceiling serving also to diffuse natural light from rooflights above. In addition, pendant fittings housing tungsten lamps hang over each bay of the bookshelves, while a multi-light pendant hangs over the counter. A smaller area of luminous ceiling, supplemented by desk lamps, lights the reference library. (Borough Engineer, J. T. Lewis, AMICE; luminous ceilings, Lumenated Ceilings Ltd.)

Left, new hangars for the BEA Engineering Base at London Airport are lit by 22 miles of cold-cathode tubing to give 35 lm ft^2 at bench level. The base comprises two main hangars, each 900 ft. long and 140 ft. wide, divided into five 180 ft. bays. Between the hangars are workshops, and these, as well as adjacent stores, are also lit by cold cathode fittings. Fittings in the hangars, arranged in continuous rows, are of an industrial trough pattern, with reflectors of vitreous-enamelled steel, each housing four 9 ft. 6 in. intermediate white tubes and the necessary control gear. Access covers at either end of each fitting are designed so that their removal disconnects the supply, while the fittings are attached to the roof structure simply by drop-end bolts for easy removal. (Lighting consultants, Barlow, Leslie & Coombes; electrical contractors, Rashleigh Phipps & Co. Ltd.; lighting fittings, the General Electric Co. Ltd.)

MISCELLANEOUS

Above, control room at an ICI factory where, in the lowered area of the ceiling, adjacent to the control panel, fittings housing 125-watt MBF/U lamps are fully recessed. Concentrating prismatic lens covers, combined with asymmetrically fitted reflectors, give a beam of light deviating 17½ deg. from the vertical, providing 25-40 lm ft² on the surface of the panel. The angle of light ensures that there are no reflections in the dials. (Lighting fittings, Holophane Ltd.)

Left, drawing office of new premises of Copperad Ltd. Situated on the top floor of the building, it has an uninterrupted floor area of about 3,000 sq. ft. and is lit by a series of luminous panels, each 22 ft. by 12 ft. in area, comprising 2 ft. sq. plastic diffusers moulded with a three-dimensional pyramidal pattern. Illumination level at the working plane, 45-50 lm ft² (Architects, Deveraux & Davies, F/FRIBA; electrical contractors, Rashleigh Phipps & Co. Ltd.; luminous ceiling, Lumenated Ceilings Ltd.)

LIGHTING ABSTRACTS

OPTICS AND PHOTOMETRY

535.3

818. IES Guide to design of light control. Part II—Design of reflector and optical elements.
Illum. Engng., **54**, 778-786 (*Dec.*, 1959).

Prepared by the Committee on Light Control and Equipment Design of the American IES, this second part of a Guide (see Abs 799 for Part I) to the design of light controlling devices is concerned with reflectors, refractors and shielding. The geometry of parabolic, elliptical, hyperbolic and spherical reflectors is dealt with and an appendix gives a step-by-step example of reflector contour design. Refraction at plane and normal surfaces is considered, and the geometrical constructions are given for the redirection of a light ray through a prismatic surface by refraction and by refraction-reflection. Lamp concealment by shielding with baffles and with various types of louvres is also briefly described. P. P.

535.64

819. Becker's colour system.
Byggmästaren, **38**, 38 (No. 5, 1959). *In Swedish.*

A colour system for surface decoration colours, in which the colours are specified by a method very similar to that of Munsell. The colours are presented in a form to enable suitable assortments to be selected. R. G. H.

535.6

820. Some observations concerning a psychological thesis on form, colour and emotions.
H. K. KRISTENSEN. *Ljuskultur*, **31**, 205-210 (No. 4, 1959). *In Danish.*

A discussion of various psychological properties of light and colour, such as luminosity (lyshed) and clarity (klarhed) which cannot be measured or expressed in figures, but which are of subjective significance. The discussion centres on a thesis by A. Rattleff offered to Copenhagen University in 1958. R. G. H.

535.234

821. Some directives for the use of Planck's radiation formula in infra-red technology.
R. SCHULZE, *Lichttechnik*, **12**, 126-130 (*Mar.*, 1960). *In German.*

As a result of work by the CIE committee on UV and IR radiation and its measurement, the chairman has prepared the present paper giving useful guidance on methods which may be followed with advantage when the formula for the spectral distribution of radiation from a full radiator is being employed. It is advocated that spectral distribution curves should be drawn with the scale of abscissae an even one, not in wave-length or frequency, but in the logarithm of either of these quantities, so that equal intervals correspond to equal increments of $\Delta\lambda\lambda$. It is also suggested that the curve should be arbitrarily truncated at wave-lengths such that the energy excluded at either end is 2·4 per cent. of the whole. Systematic methods for integrating between defined limits are described. J. W. T. W.

LAMPS AND FITTINGS

621.329

822. Modern Finnish light fittings.
C. B. HOLMBERG, *Ljuskultur*, **31**, 192-196 (No. 4, 1959). *In Swedish.*

New designs of light fittings chiefly of opal plastic and treated metal. The Finnish lighting design school grew up when supplies for Germany were cut off during the war. Examples of work by Lisa Johansson-Pape, Alvar Aalto, Yki Nummi, and Mauri Almari are illustrated. R. G. H.

621.327.534.15

823. Slow decay rates of phosphors in fluorescent lamps.
C. W. JEROME, *Illum. Engng.*, **54**, 769-773 (*Dec.*, 1959).

Oscillograph traces of the light output of fluorescent lamps operating on AC and DC are used to illustrate the fact that there are two phosphor decay rates, one which is very fast in comparison with the AC cycle and the other which is relatively slow. The flicker produced by a fluorescent lamp results from the fast decay component associated with blue phosphors, but in many lamp colours the flicker is largely masked by the presence of a slow decay component resulting from the use of manganese as an activator. The decay rate of manganese-activated phosphors is modified by the crystal matrix making up the phosphor, and thus different phosphors (i.e. different lamp colours) are associated with different degrees of flicker. P. P.

621.326

824. Incandescent lamp design life for residential lighting.
W. M. POTTER and K. M. REID, *Illum. Engng.*, **54**, 751-757 (*Dec.*, 1959).

Calculations have been made of the design life for a tungsten-filament lamp to give the lowest cost of light for domestic usage. The cost-of-light equation employed took account of such factors as labour costs for lamp replacement and cleaning (7d. = 10d.), electricity charge (2½d. per unit) and annual fixed charges (amortized cost or wiring and fittings, etc. 2s. 7d. = 8s. 11d.). On this basis it was found that 60,100 and 150-watt, 120-volt lamps having present (US) design lives of 1000, 750 and 750 hours respectively, would need to be designed for lives of 450, 350 and 300 hours to give the lowest cost of light. On the other hand, if such non-engineering factors as the inconvenience of making frequent lamp replacements are also taken into account, then the present design lives are considered a satisfactory compromise. P. P.

621.326

825. Applications of the quartz lighting lamp.
C. J. ALLEN and R. L. PAUGH, *Illum. Engng.*, **54**, 741-746 (*Dec.*, 1959).

Characteristics of a newly developed line of filament lamp using quartz-tube envelopes and the iodine regerative cycle are (i) high wattages in small-sized bulbs, (ii) increased life and (iii) good luminous efficiency with practically no reduction in light output throughout life. (i) above makes possible the use of small-sized reflectors with a high degree of optical control. The new lamps have been used in runway floodlighting, aircraft taxying marker lights and an oxygen regenerative cell, and have potential uses in industrial, shop and outdoor lighting installations. P. P.

621.326

826. An iodine incandescent lamp with virtually 100 per cent lumen maintenance.
E. G. ZUBLER and F. A. MOSBY, *Illum. Engng.*, **54**, 734-740 (*Dec.*, 1959).

The life and lumen maintenance of an incandescent lamp depend on the rate at which tungsten is evaporated from the filament and deposited on the bulb wall. The introduction of iodine vapour into such a lamp induces a regenerative cycle whereby the iodine combines with the deposited tungsten and transfers it back to the filament, resulting in increased life and almost 100 per cent lumen maintenance. The bulb wall and filament temperatures are critical, as also are the iodine concentration and the absence of impurities. Drastic reductions in lamp size are possible, both for quartz-tube and the more conventional pear-shaped filament lamps. P. P.

621.327.534.15

827. Significant advances in the design of non-circular cross-section fluorescent lamps.
J. O. AICHER and E. LEMMERS, *Illum. Engng.*, **54**, 39-43 (*Jan.*, 1960).

Since non-circular cross-section fluorescent lamps were first introduced three years ago, significant improvements in their operating characteristics have been achieved by redesigning the lamp bulb cross-section. In particular, the circular cross-section bulb-strengthening zones in the earlier lamps have been replaced by further grooves. By shortening the groove length, it has been possible to use thinner glass, involving a 25 per cent weight reduction. Furthermore, the resultant longer arc length has added the equivalent of an extra foot to the 8-ft. lamp. Other design changes have been an improved cross-section for the grooves, and the provision of two slightly deeper grooves to control mercury vapour pressure by localized cooling. An 8 ft., 215-watt lamp now gives 15,000 lumens at 100 hours. P. P.

621.327.534.15

828. External control of mercury pressure of fluorescent lamps and its application to luminaires.
P. J. UNDERWOOD and C. E. BECK, *Illum. Engng.*, **55**, 47-52 (*Jan.*, 1960).

Previous work has shown than an improvement in fluorescent lamp light output can be obtained if the lamp bulb wall is locally

cooled, so reducing the mercury vapour pressure and increasing the lamp current. Of the methods for achieving this localized cooling, that particularly favoured is a 'sail' approximately 7 sq. in. in area, made of aluminium or copper and attached to a metal 'shoe' approximately ½ in. wide and 1 in. long held in contact with the bulb wall. Measurements have shown an average gain in light output of 8 per cent in an office with open-top suspended luminaires and of 8-18 per cent below an enclosed luminaire recessed into a simulated ceiling cavity. P. P.

621.327.534.15

829. Problems and progress in electroluminescent lamps.

H. F. IVEY, *Illum. Engng.*, **55**, 13-20 (*Jan.*, 1960).

Various factors influencing the performance of electroluminescent lamps are briefly summarized and illustrated by graphs showing the relevant experimental data. These factors include phosphor particle size, operating frequency, electrode resistance, glass thickness and external circuit parameters. Various types of electroluminescent lamp have now been produced, including multi-layer lamps in which the different layers emit light of different colours, single-layer lamps in which the emission colour can be changed by altering the applied frequency, and flexible lamps. Continuous transparent electroluminescent phosphor films on a glass base are a recent development enabling appreciable light output to be obtained for comparatively low applied voltage. P. P.

830. Phosphors for electroluminescent lamps. 621.327.534.15

L. W. STROCK, *Illum. Engng.*, **55**, 24-29 (*Jan.*, 1960).

The phosphor in most general use in electroluminescent lamps is zinc sulphide activated with copper and chlorine. Although this phosphor is excited by ultra-violet light (photoluminescence), only by special processing can it also be excited by an electric field (electroluminescence). This leads to the conclusion that in addition to the crystal composition (the principal criterion of photoluminescence), the structure of the phosphor crystal is important in electroluminescence. This is elaborated upon by descriptions, photographs and diagrams of the crystal structure of zinc sulphide, emphasis being given to the structural disorders necessary for electroluminescence. P. P.

621.327.534.15

831. Electroluminescent sources in automotive instrument lighting.

J. M. HARRIS and P. J. BLINKILDE, *Illum. Engng.*, **55**, 32-37 (*Jan.*, 1960).

Requirements for the satisfactory lighting of car instrument dials are first given, and the design features whereby these dials can be illuminated by conventional sources are described. A considerable saving in space, together with greater control of brightness, can be achieved by using electroluminescent panels energized by a 200 volt 250 cycle transistorized oscillator operating from the car battery. The dials are formed from electroluminescent panels from which all but the requisite letters and figures have been masked. Instrument pointers consists of fine wires on which the appropriate coatings have been deposited. The design of the electrical connections to these pointers depends on whether the pointer has a low or high degree of torque (gauges or speedometer) or is continuously rotating (clock). P. P.

621.327.534

832. Improved mercury lamp transformer for maximum regulator loading on series circuits.

M. E. ROBERTSON, *Illum. Engng.*, **55**, 87-92 (*Feb.*, 1960).

Series operation of mercury vapour lamps has many advantages but normally involves very high voltages, an expensive constant current regulator and a device to maintain the series circuit in the event of lamp failure. If, on the other hand, each lamp is fed from an isolating transformer, the high voltage supply need not be taken beyond the bases of the street-lighting poles, while the transformer primary winding maintains the series circuit regardless of the lamp's condition. Lamp starting is effected by 'cascade operation', there being sufficient voltage available to operate the easiest starting lamp, after which the available starting voltage progressively builds up to cope with the more difficult lamps. The design of the isolating transformer has been given particular attention to improve the power factor and thus enable more lamps to operate from each constant current regulator. P. P.

621.327.534.15

833. Evaluation of methods for localized cooling of fluorescent lamps in outdoor luminaires.

M. E. KECK, *Illum. Engng.*, **55**, 102–106 (*Feb.*, 1960).

The dependence of fluorescent lamp light output on ambient temperature is particularly emphasized when a 6-ft., 1,500 ma lamp is operated in an outdoor-type enclosed fitting, the temperature build-up inside the fitting being so great that maximum light output is only achieved with the fitting in an outside ambient temperature of 0°F. Localized cooling by means of general air circulation and directed air flow within the fitting, and by conduction and refrigeration of the lamp bulb wall have all resulted in appreciable improvement in light output at high ambient temperatures. It would appear though that the conduction and refrigeration techniques require lamp and lamp holder design changes to ensure good thermal contact. P. P.

LIGHTING

834. Blue or red. 535.6

B. ALGERS, *Byggmastaren*, **38**, 77 (No. 11, 1959). *In Swedish.*

The rebuilding of the Royal Theatres of Drama and Opera in Stockholm has raised the question of suitable colours for the auditorium. Apart from the public preference for red (many architects preferred blue), the inter-dependence of the colours of the auditorium and the choice of illuminant has to be considered. The low-efficiency lamps of earlier days may have blended with the blue colour previously used, but the higher efficiency lamps of today demanded warmer colours for the decorations. Producers also require that the light reflected back on to the stage from the auditorium shall not be of a cold tone. R. G. H.

835. Lighting of Tancarville Bridge. 628.971.6

L. GAYMARD, *Lux*, 144 (*Dec.*, 1959). *In French.*

The new suspension bridge at Tancarville, le Havre, is briefly described; it is a large suspension bridge with a clear span between towers of 608 m and a total length of 1400 m. The carriageway is 12·5 m. wide, and the footpaths 1·35 m. each. It is lighted by lanterns mounted at 8 m. high on slender steel columns carried on the parapet, with an overhang bringing them a little beyond the kerb; the spacing is 21·5 m., opposite arrangement. The lanterns are hermetically sealed and contain at present 125-watt mercury fluorescent lamps. There is privision for increasing the size of the lamps to 250-watt on the deck of the bridge, 400-watts for the north and south approaches and 750 or 1,000-watt for the vicinity of the toll booths on the north side only where the width of the carriageway is enlarged to 45 m. J. M. W.

628.971.6

836. Critical comparison of existing street lighting installations.

I. FOLCKER, *Lichttechnick*, **12**, 17-22 (*Jan.*, 1960). *In German.*

Compares a number of traffic route installations on the basis of the ease of seeing certain objects in the field of view. Good street lighting should enable drivers to proceed without headlights and therefore should make a pedestrian clearly visible at a distance of 300 metres wherever he may be on the roadway and whether the road surface is wet or dry. This is the criterion adopted by the author for comparison six installations of which technical details are given, with photographs taken under both wet and dry conditions. J. W. T. W.

628.93

837. Utilization factors for indirect and horizontal components.

R. CROFT, *Trans. Illum. Eng. Soc. (London)*, **25**, 37–38 (No. 1, 1960).

R. H. Simons (Abs. 797) has shown how the considerable amount of work involved in applying the Jones-Neidhart zonal flux method to interreflected light calculations can be largely circumvented by considering the light flux as being divided into three components. For those workers having luminance data for which the horizontal component is expressed as a sine function, rather than as a uniform radial component, the author has worked out utilization factors for the indirect and horizontal components from the Jones-Neidhart curves, so that these luminance data can be used in conjunction with Simon's utilization factors for the direct component. P. P.

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The IES has played a major part in the development of better lighting. The following is a list of companies and organisations who show their appreciation of the work of the IES by being Sustaining Members of the Society.

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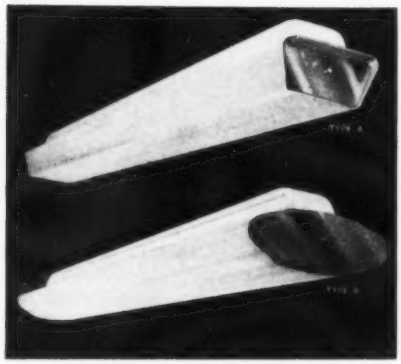
Holland House Electrical Co. Ltd.
Holophane Ltd.
Hume, Atkins and Co. Ltd.
Imperial Chemical Industries Ltd. (Alkali Division).
Imperial Chemical Industries Ltd. (Metals Division).
Imperial Chemical Industries Ltd. (Paints Division).
Imperial Chemical Industries Ltd. (Plastics Division).
Inductive Appliances Ltd.
J. A. Jobling and Co. Ltd.
James Kilpatrick and Son Ltd.
Knightshades Ltd.
Lancashire Dynamo Electronic Products Ltd.
Leeds Education Committee.
Linolite Ltd.
Littlewoods Pools, Central Maintenance Department.
Corporation of Liverpool.
London Electricity Board.
London Typographical Designers Ltd.
Joseph Lucas Ltd.
Lumenated Ceilings Ltd.
Luxram Electric Ltd.
Marryat and Place Ltd.
Merchant Adventurers Ltd.
Merseyside and North Wales Electricity Board.
Midland Electric Installation Co.
Midlands Electricity Board.
Mortimer Gall and Co. Ltd.
Nettle Accessories Ltd.
New Era Lighting Industries (Pty.) Ltd., Johannesburg.
Newey and Eyre Ltd.
North-Eastern Electricity Board.
North-Western Electricity Board.
North-Western Gas Board (Liverpool Group).
Oldham Corporation Street Lighting Dept.
Oldham and Son Ltd.
Patent Glazing Conference.
Philips Electrical Ltd.
S. A. Philips (Pty.) Ltd., Johannesburg.
Pilkington Brothers Ltd.
Poles Ltd.
F. H. Pride Ltd.
Prudential Assurance Co. Ltd.
Albert E. Reed and Co. Ltd.
Revo Electric Co. Ltd.
Fred Reynolds Ltd.
John Riley and Son (Electrical) Ltd.
J. Rivlin Ltd.
Robinson, King and British Challenge Glazing Co. Ltd.
Rogers, G. S. (Pty.) Ltd., Johannesburg.
Rowlands Electrical Accessories Ltd.
Satchwell and Gittings Ltd.
James Scott and Co. Ltd.
Siemens Edison Swan Ltd.
Siemens Edison Swan (Pty.) Ltd., Johannesburg.
Sign Components Ltd.
Simplex Electric Co. Ltd.
S.L.R. Electric Ltd.
Herman Smith Smithlite Ltd.
Wm. Allan Smith and Co. Ltd.
W. H. Smith and Co. (Electrical Engineers) Ltd.
J. G. Sneath Ltd.
South-Eastern Electricity Board.
South of Scotland Electricity Board.
South Wales Electricity Board.
South-Western Electricity Board.
Southern Electricity Board.
Stella Lamp Co. Ltd.
Strand Electric and Engineering Co. Ltd.
Borough of Stretford.
Strong Electric Corporation (Great Britain) Ltd.
Superconcrete Pipes (S.A.) Ltd., Johannesburg.
Superior Manufacturing Development Co. (Pty.) Ltd.
Thermo-Plastics Ltd.
Thorn Electrical Industries (S.A.) (Pty.) Ltd., Johannesburg.
F. W. Thorpe Ltd.
Troughton and Young Ltd.
Tucker and Edgar (Teeanee) Ltd.
Verity's (Maxlume) Ltd.
Walsall Conduits Ltd.
J. Walton (Electrical) Ltd.
Wardle Engineering Co. Ltd.
J. M. Webber and Co. Ltd.
Whitworth Electric Lamp Co. Ltd.
Wokingham Plastics Ltd.
A. J. Wright (Electrical) Ltd.
Yorkshire Electricity Board.

NEW PRODUCTS

Commercial fluorescent fittings

THE BENJAMIN ELECTRIC LTD announce the introduction of their 'Litemaster' range, this being the first time that the company has offered a range of commercial fluorescent fittings. The new range is built around two basic units which, in themselves, are easy to instal and maintain; variations to suit personal taste are made possible by the introduction of colour and shape to the end feature. Two types of ribbed acrylic plastic diffuser are available. For relamping, cleaning and maintenance one end plate is removed, when the diffuser can then be



detached from one side and will hang from the channel on the other side. There are two basic models, A and B, differing in size and shape, all fittings being available for ceiling or pendant mounting. The range covers single and twin 4 ft. and 5 ft. lamps.

Type A is available with stepped end-plates (to allow light to flow from the extremities of the diffusers) or with enclosing end covers. Type B is available with enclosing end covers only. All end-plates and covers are made in metal and are available in white, red, yellow and gold and with 'sparkle' holes if required.

With Type A there is a choice of sixteen end-plate variations, and with Type B a choice of eight. Based upon the Benjamin 'Taskmaster' one-piece channel, the 'Litemaster' incorporates the same details concerning control gear, fixing, lampholders, etc. Existing 'Taskmaster' fittings can be adapted to 'Litemaster' with the necessary diffuser kit. Prices are between £11 19s. 5d. for single 4-ft. 40-watt fitting and £21 18s. 1d. for the twin 5-ft. 80-watt fitting inclusive of tax.

Benjamin Electric Ltd, Brantwood Road, Tottenham, London, N17.

Colour matching unit

A REDESIGNED SIEMENS EDISWAN colour matching unit, based on the success achieved over the past years with the industrial unit, has been produced by the Lamps and Lighting Department of AEI Radio and Electronic Components Division. It will find applications in many industries, e.g. paint manufacture, colour printing, fabrics, papermaking, cosmetics and foodstuff preparation, where a light source accurately simulating north sky daylight is required. The price of the basic unit, including purchase tax on the lamps, is £25. It employs two 2-ft. 40-watt special blue fluorescent lamps and two 60-watt pearl single coil gas-filled filament lamps. Their output is blended and diffused within the unit to give a spectral quality almost identical with that of natural daylight at a colour temperature of 6,500-7,000 K. The diffusing window measures 23¼ in. by 17 in. and is a large area source of low brightness which compares with a window illuminated by natural daylight. The unit consumes about 220 watts and produces about 3,000 lumens. Samples can be examined under illumination intensities of between 45 lm ft² on a plane 3 ft. below the window, and 20 lm ft² 5 ft. below. Control is effected by a three-position switch with 'Northsky Daylight', tungsten lamps only, and 'Off' positions. The unit (less stand) is fabricated in mild steel sheet, is of welded construction, and is finished externally in an attractive mushroom-coloured stove enamel, internally in

white stove enamel. It measures 24½ in. long by 18⅜ in. deep by 14½ in. high, and, with gear and lamps, weighs 30 lb. It can be suspended from stout wire clips which hook into the louvres at each end of the unit. Also available, at 4 gns. extra, is a special stand for use where it is not convenient to suspend the basic unit.

AEI (Woolwich) Ltd, 38/39 Upper Thames Street, London, EC4.

Industrial reflector for colour-corrected mercury lamps

FALK, STADELMANN ARE NOW offering immediate delivery of their new 'Ranmore' range of industrial reflector for colour corrected mercury vapour lamps. These reflectors, which are of the overlamp through draught type, are of spun aluminium with an anodized reflecting surface to give a light output ratio of the order of 76 per cent. The lampholder housing is an open type die casting giving a degree of upward lighting and embodies a cool wiring box. These reflectors are of the high bay type with approximately 20 deg. over-all cut-off, the maximum spacing height ratio being 1½ to 1. They are suitable for any indoor or under cover industrial application such as in factories, workshops, stores and sheds.

Falk, Stadelmann & Co Ltd, 91 Farringdon Road, London, EC1.

Prefabricated suspended luminous ceiling

LUMITRON LTD HAVE introduced a patented prefabricated suspended luminous ceiling. The ceiling can be installed for wall to wall coverage giving over-all illumination or alternatively over specific areas of a ceiling. The adaptability and interchangeability of basic designs permits a variety of ceilings to be obtained, not only in the original installation but also afterwards if changes are desired. The ceiling has been designed so that the electrical contractor can carry out his own installation from beginning to end. The tracks, hanger supports, brackets and corrugated diffusers for complete coverage of a ceiling area approximately 40 ft. by 9 ft. (360 sq. ft.) with a cavity of 18 in. can be calculated at 5s. per sq. ft.

Lumitron Ltd, 180 Shaftesbury Avenue, London, WC2.

Polyethylene lampshade

A NEW TYPE OF OPAL lampshade has been introduced by H. W. Field & Son Ltd for use in offices, hospitals, schools and commercial and industrial organizations. The new shades, which are made from 'Rigidex' high density polyethylene supplied by British Resin Products Ltd, are available in two sizes, 13 in. and 11 in. in diameter, with a 4¼-in. hole in the top suitable for fitting to standard monkscap suspensions. The shades are intended for use with ordinary tungsten lamps and give an even light distribution with no glare. The 13-in. size will accommodate lamps of up to 300 watts. They are available individually or as complete fittings with either a brass cap and PVC suspension or a chromium-plated cap with a 2-ft. chromium tube suspension. The lampshades are rigid and tough and have good resistance to chemicals, oils and greases. They have good heat stability and can be washed in boiling water.

H. W. Field & Son Ltd, Harold Wood, Essex.

MISCELLANY

Correspondence

Glare

SIR,—In the March issue 'Lumeritas' raised an interesting point in connection with glare indoors, considering it less prevalent or severe than in the past. Is it less prevalent? Glare is generally associated with tungsten filament lamps, but not with tubular fluorescent lamps. Many people mistakenly believe that more light necessarily means better lighting; this is true only when certain conditions are satisfied. That this is not generally appreciated is shown by the large and increasing number of bare fluorescent lamp installations in factories and offices.

The numerical rating of glare is unlikely to interest the users of lighting very much, but they should be advised of the importance of preventing glare by the use of suitable reflectors or adequate diffusing covers. This applies particularly to the smaller companies who see an economy in the use of batten type fluorescent fittings.

We know that it is easier to see things clearly and that an interior looks much better without glare, and it should be emphasized that the extra initial cost in providing reflectors or diffusers is slight when considered in relation to the greatly improved effectiveness throughout the life of the lighting installation.

Hampshire DAVID SCOTT

Education in illuminating engineering

SIR,—Whilst sympathizing with your correspondent in your March issue concerning education in illuminating engineering, I fail to see why he is so disgruntled when his application for a selling job has been turned down. Surely if he has a first-class City and Guilds Certificate in Illuminating Engineering he would be welcomed by a number of firms for a more technical occupation than selling. There is a great shortage of adequately trained lighting engineers, as a perusal of your 'Situations Vacant' columns will show. I think your correspondent will in fact find that he is on a position to pick and choose. He should feel well rid of a firm who put no store on educational attainments, and pick one more enlightened.

Although it is wrong to blame the industry as a whole, it is a rather disturbing truth (as indicated in the letter and in Mr H. Hewitt's 'Random Review of 1959') that, apart from a very few enlightened and far-seeing firms, the majority of the industry are just not facing up to the situation. They have no schemes for training lighting engineers. They think themselves clever when they attract an apprentice from one of the larger firms which have training schemes immediately his training is completed. This procedure is neither clever nor responsible. It is in fact distinctly harmful to the industry and to the country as a whole.

Not only should lighting firms train considerable numbers of lighting design engineers, but they should sponsor a certain number of students for Degree or Dip. Tech. qualifications in Electrical Engineering and Applied Physics for higher posts in design and research. They will then stand a chance of raising the importance and status of the industry. If they act fairly quickly they might even be able to regain some of the initiative that is being lost to those countries abroad whose awareness of the importance of education is never in doubt.

Northampton College, London C. A. PADGHAM

Situations

Vacant

YOUNG MAN, with first-class experience in Lighting Fittings Trade, required to take up interesting position in connection with sales development in old-established business. Reply, stating age, salary required and experience to Box No. 706.

DESIGNER DRAUGHTSMAN, young, required by well-known lighting firm to develop new designs of decorative and commercial lines. Reply stating age, salary required and experience to Box No. 707.

S.L.R. Electric Ltd require a young REPRESENTATIVE contacting Electrical Contractors, Ministries, Railway and Hospital Authorities etc. Salary according to age and experience. Expenses and car allowance. Write in confidence to 2 Peterborough Road, Harrow, Middlesex.

Lumenated Ceilings Ltd have a vacancy for an experienced LIGHTING ENGINEER in their London Office for preparation of specialized lighting schemes. Applicants must be prepared to discuss proposals with architects, consultants, etc. Position is permanent, pensionable and carries a starting salary of up to £800 p.a. and bonus. Applications giving full details should be sent in confidence to Chief Lighting Engineer, Alliance House, 12 Caxton Street, SW1.

TECHNICIANS, experienced in photometry and optical design of lighting fittings and equipment, and or design, development and testing of chokes and transformers for discharge lamps used in the lighting industry. Competitive salary. Canteen and social facilities. Pension scheme. Reply to Box No. 708.

Troughton & Young (Lighting) Ltd. have a vacancy for an ASSISTANT LIGHTING ENGINEER with some experience in the planning of commercial lighting installations. Ability to deal with customers at all levels. Age 24/28. Full details to Technical Director, 143 Knightsbridge, London, SW1.

DESIGNER DRAUGHTSMAN for electric light fittings. London area. Good prospects. Five-day week. Apply stating age, experience and salary required, to Box 709.

Steensen, Varming & Malcahy, Consulting Engineers, are considering employing a LIGHTING DESIGNER to work in conjunction with their Electrical Engineers on the design of lighting installation for buildings. Applicants should have a degree in Architecture, Physics or Engineering, and be a Graduate or Associate member of an appropriate Institution. Experience in design of fittings and installations is desirable. Apply 146 New Cavendish Street, W1.

Trade Literature

THE BENJAMIN ELECTRIC LTD, Brantwood Road, Tottenham, London, N17. Leaflet giving details and prices of a new range of 'Litemaster' fluorescent fittings for use in offices, restaurants and shops.

CLARKE, CHAPMAN AND CO LTD, Victoria Works, Gateshead 8, Co Durham. Leaflet describing the Ward-Leonard Winch for AC or DC supply.

C. M. CHURCHOUSE LTD, Clarendon Works, Clarendon Cross, London, W11. Publication No. 182 giving details and prices of the CMC multiple and cluster glass pendant lighting fittings.

HARRIS AND SHELDON (ELECTRICAL) LTD, 46 Great Marlborough Street, London, W1. A comprehensive catalogue giving full details of the company's lighting fittings including the new 'Luveline' range, commercial and industrial fluorescent fittings, modular fittings, luminous ceiling fittings, spotlights and the range of 'Ionic' glass pendant and wall fittings. Each easily identified section is fully illustrated and contains technical data with illustrations of fittings, line drawings and photographs of installations.

ROWLANDS ELECTRICAL ACCESSORIES LTD, REAL Works, Hockley Hill, Birmingham 18. A booklet entitled *Reflectortight History* which gives a report on the performance of 'Reflectortight' fittings used in a variety of industrial situations and under a wide range of operating conditions. Copies are available on application to the above address.

THE SIMPLEX DAIRY EQUIPMENT CO LTD, Cintra House, Cambridge. A booklet illustrating high pressure mercury plant irradiators including examples of recent installations.

TROUGHTON AND YOUNG (LIGHTING) LTD, 143 Knightsbridge, London, SW1. A brochure giving details of a new range of

ceiling and suspension fittings which have particular application for schools.

Personal

The following appointments within the Lighting Division and the Osram Lamp Division of the GEC Ltd have been announced: Lighting Division: MR W. A. VILLIERS, Manager; MR D. W. DURRANT, Commercial Manager; MR C. DYKES-BROWN, Technical Sales Manager; MR A. C. C. MOORE, Manager, GEC Lighting Equipment Ltd. Osram Lamp Division: MR W. J. A. WOODWARD, General Manager, Manufacture and Development; MR A. H. WILLOUGHBY, Technical Manager; MR L. A. MILLS, General Sales Manager; MR S. F. STRINGER, Overseas Sales Manager; MR S. K. HARDY, Chief Accountant; MR H. O. WEARE, Administration Manager.

MR H. V. SAYCE, the longest serving member of the Midland Region of the AEI Lamp & Lighting Co Ltd, has retired after forty-eight years' service with the firm. He joined the BTH Company, Lamp and Wiring Supplies Division, in 1912 and after service in the 1914-18 war became a representative for Birmingham and the North Midlands in 1921. He opened the Cheltenham Depot in 1924 and was Area Superintendent there until his retirement. He is a past chairman and treasurer of the Gloucester and Cheltenham Centre of the IES.

Revo Electric Co Ltd announce the appointment of MR W. F. GRIFFITHS as Southern Regional Sales Manager, Industrial Division. Since the war, Mr Griffiths has served with Siemens Electric Lamps & Supplies Ltd as Manager, Illuminating Engineering Department (1947) and Crompton Parkinson Ltd as Chief Street Lighting Engineer (1950), General Manager, Crompton Parkinson (South Africa) Pty Ltd (1955) and Assistant Manager, London Branch Supplies Division (1958).

Industrial Notes

THE ELECTRIC LIGHT FITTINGS ASSOCIATION has just published a booklet entitled *Guidance Notes for Purchasers of Street Lighting Lanterns*. The notes have been compiled to help the purchaser to assess the quality of a lantern; they are not a British Standard and are neither a minimum quality specification nor a guide to the technique of street lighting. The Electric Light Fittings Association prepared a questionnaire on a variety of aspects of street lighting lanterns, in order to emphasize the importance of ensuring reasonable standards of construction and maintenance. This was widely circulated amongst the members of the Association of Public Lighting Engineers who then summarized the comments. The summary led to joint discussions between the appropriate technical committees of the two Associations, as a result of which this booklet has been prepared. Street lighting lanterns are expected to function satisfactorily for many years, often in dirty and corrosive atmospheres. Only lanterns of the best design, materials and workmanship can meet these requirements. Quality of this kind cannot be defined precisely in a specification which must necessarily cover a great variety of designs and materials and ELFA therefore prepared these notes, based on many years of experience in manufacture by members of ELFA and in use by members of APLE. They are intended to help the purchaser to recognize good and bad points in design, materials and in workmanship and to be able to evaluate them for his own requirements and conditions against the purchase price and probable maintenance costs. An important section also deals with maintenance. The booklet is being distributed widely to public lighting engineers and local authorities. Readers requiring copies should send their orders, with remittance to cover the cost of 2s. per copy (post free in the UK) to the Electric Light Fittings Association, Regent House, 89 Kingsway, London, WC2.

THE ELECTRICAL CONTRACTORS ASSOCIATION have become members of the British Lighting Council. Mr L. C. Penwill, Director and Secretary of the ECA, will represent that organization on the British Lighting Council, Council of Management and the Executive Committee.

ATLAS LIGHTING LTD are now marketing all fittings manufactured by George Forrest & Son Ltd, Arundel Road, Industrial Estate, Uxbridge, Middlesex. While both companies are subsidiaries of the Thorn Electrical Industries Group, Forrest lighting fittings have previously been separately handled. The Forrest Modern ranges of metal and glass lighting fittings are now available through normal Atlas distribution channels and subject to normal decorative tungsten fittings discount and rebate terms. Full information and literature is now obtainable from all Atlas Area Offices and representatives.

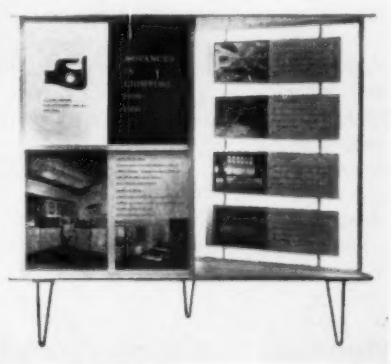
WORK IS NOW BEING COMPLETED at 113-115 Portland Street, Manchester, where three floors are being completely modernized to form the new Building Centre for the North of England. In preparation for the opening, the offices of the Centre have moved into these premises from their temporary office in the College of Science and Technology. The Centre is intended primarily for the use of all the people who are in any way connected with the inspection and specification of materials for building. It will provide an unbiased information service and a permanent but constantly changing exhibition of building products. Space has been reserved for visiting exhibitions and for meetings, lectures and technical demonstrations.

CROMPTON PARKINSON LTD have vacated their former premises in the centres of Manchester and all services will now be carried on from a new branch at Crompton House, Langley Lane, Wythenshawe, Manchester 22. This is now the company's main supply point for the north-west area.

THE BRITISH LIGHTING COUNCIL has published a revised edition of its booklet *Lighting for Tailoring and Garment-making*, price 1s. 6d. per copy.

THE NEW BUILDING FOR THE Belfast Branch of The General Electric Co Ltd was opened at the end of February by Captain Terence O'Neill, Ulster Minister of Finance. Sir Leslie Gamage, Chairman of the Company, and Mr W. J. Bird, Director for sales and marketing development, were present at the opening. Situated in York Street at the junction of Great Patrick Street, the new building is four storeys high with showrooms and trade counter on the ground floor. Most of the second floor is devoted to stores, which with ancillary services total some 15,000 sq. ft. Other floors are mainly offices.

ON BEHALF OF THE IES GOLDEN JUBILEE celebrations last year, Mr Derek Phillips, ARIBA, designed a display panel for use in showrooms to illustrate developments in lighting in various fields during the fifty years from 1909 to 1959. The basic design



has been adapted by the Southern Electricity Board (see illustration) and shows good examples of modern lighting for the home, offices, industry, highways, shops and sports.

AS A DIRECT RESULT of successful experimental installations with Philips transistorized fluorescent lighting system, two public transport undertakings have decided to fit the system in a number of new trolley-buses and motor-buses. At Reading, where the Corporation transport authority has had a trolley-bus and a motor-bus in service with Philips fluorescent lighting for several months, twelve new trolley-buses are to be similarly equipped. At Stoke-on-Trent, the Potteries Motor Traction Co Ltd has decided that twenty of their new 'Atlantean' lowbridge double-decker buses, all to be delivered this year, should be fitted with fluorescent lighting.

Postscript

'WHAT IS THE MOST SUBTLY flattering factor in a woman's life? What gives a completely individual look—irrespective of how much you spent on the furnishings? What, in fact, is the most important thing in any home? The answer: effective lighting.' I quote these questions and their answer from a recent article in London's *Evening Standard*. Its title is 'Woman's best friend: lighting', and it is written by a woman who is not professionally engaged in selling lighting. Low lights, she suggests, do magic for a pretty face and transform a dull room into one with 'character'. Candlelight, she thinks, weaves the best spells and, by it, 'all the romance of a Venetian ball' can be captured. Certainly candlelighting can be very pleasing in some situations on some occasions, and long may it remain in our lighting repertory. But candlelighting as Dicken's Bob Crachit knew it, and as it was experienced in many bedrooms in the early years of the present century, was anything but romantic and spell binding. I can remember a Council meeting of the IES in the 1940s which was conducted by candlelight because of a power cut. No one thought it 'adequate and suitable' for the purpose in hand and—being a collection of mere men—there were no pretty faces for which candlelighting could 'do magic'.

THE LIGHTING ENGINEER and the ophthalmic practitioner share a common aim. Both are concerned to facilitate seeing, although each strives in his own way to fulfil his praiseworthy task. Clearly, each should appreciate the contribution the other can make to the welfare of 'clients'. Both, too, should practise what they 'preach'—the lighting engineer should wear any refractive correction he may need to give him clear and comfortable seeing and the ophthalmic practitioner should use proper lighting in his consulting room. In a recent issue of *The Optician*, an ophthalmic practitioner gave his views on the subject of suitable lighting for consulting rooms and I will summarize them. He mentions that in the area of his practice domestic lighting is diverse as to illuminant and illumination. He is convinced that the kind of illumination most commonly employed in houses is the most suitable for opticians' consulting rooms, since it will not mask a patient's need for, say, reading glasses—as might the 'wealth of illumination' in the local emporium. There is obvious common sense in this *if* there is little hope of the patient's home lighting being improved. In the practitioner's own consulting room he uses a 60-watt lamp four feet above the patient's head and this, he says, appears to suffice for most near vision tasks. Some of his patients say their home illumination is better than this, while others say theirs is not so good. Nothing is said about the illumination on wall sight-testing charts and there is little to indicate that this practitioner realizes sufficiently how his patients can be assisted by higher levels of illumination in their places of employment. He certainly advises that a well-designed reading lamp should be available in the consulting rooms of general ophthalmic practice 'so that its advantage can be demonstrated to those who have a *sub-normal acuity* in near vision' and have electric light available to them. 'Self-illuminated sub-normal vision devices also have their advantages. Apart from the use of these devices the practical application of lighting seems to be limited.' Well, we can hardly agree with this! And what about the better than clinically 'normal' acuity which is required for doing numerous work-a-day tasks? This certainly calls for better illumination than the author of this article seems to envisage. He says, in fact, that 'while lighting is directly concerned with vision the effects of modern lighting are primarily and rightly more concerned with the good influence it has on the mind, the mental satisfaction accorded being reflected in all the senses through the medium of sight'. We can certainly agree that good modern lighting is intended to afford mental satisfaction—even if this is not reflected in *all* the senses, e.g. taste and smell. But, although this objective of modern lighting is now given due emphasis, it is to be hoped that opticians in general fully realize that better-than-consulting-room lighting gives better seeing to normal sighted persons. To say that it 'primarily stimulates the mind' is rather like putting the cart before the horse.

THE ASWAN HIGH DAM PROJECT has drawn attention to an unsolved mystery of lighting. Construction of this dam will threaten the ancient Nubian temples at Abu Simbel with inundation, and these temples contain murals and hieroglyphics which seem to have required better lighting for their execution than any that is supposed to have been available in the temples. Cut into solid rock to a depth of 200 ft., the great temple of Rameses II has no natural lighting except that derived from a relatively narrow entrance. Branching from the cave 'nave' are other man-made caves, or transepts, to which absolutely no daylight penetrates directly and almost none indirectly. Although it is said to be certain that lamps were not used, the walls of these transepts are covered with beautiful reliefs and numerous inscriptions. How did the creators of these see to execute them 3,000 years ago? It has been suggested that the only explanation—unlikely as it may seem—is that light was borrowed by a complicated arrangement of mirrors. Surely, however, this is not the only possible explanation: even if lamps were not used more primitive flame sources of light were known.

RECENTLY IMPORTED FROM GENEVA is a timepiece which is functionally dependent upon light. No, it is not a sundial. It is a clock equipped with a photo-electric cell whose output charges a micro-accumulator that provides the current necessary to operate the horological mechanism. You can buy one of these novelties for about £400 upwards if you fancy one and are not content with a £4 mains-operated model.

THE MAGIC OF LIGHTS is the theme of my first topic this month and it shall be the theme of my last. How spell-binding were the pyrotechnic lights in St James's Park recently in honour of General de Gaulle. They delighted young and old alike and, through the medium of television, millions were able to get some colourless idea of them.

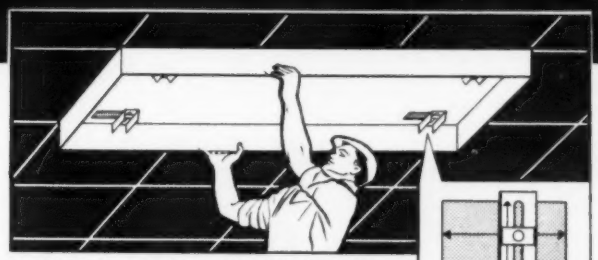
'Lumeritas'

atlas modulite

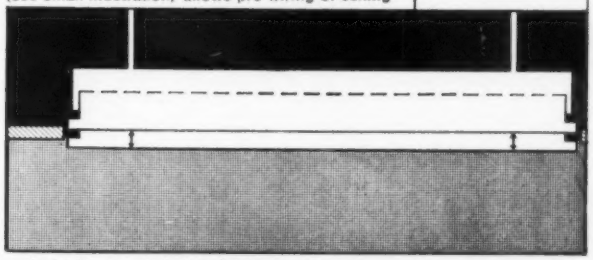
New Modular troffers streamline false ceiling lighting installation

Ease of installation, complete flexibility and big savings in installation costs . . . these are the features which make the redesigned Atlas 'Modulite' recessed troffer fittings a *must* for modular ceilings today. Features of the redesigned modulite range include: hidden spring clips providing positive lock on diffusers and simplifying removal; 2, 4, 6 or 8ft lengths on a 2ft module; open-ended versions for continuous mounting; alternative suspension for true or false ceilings; choice of three diffusers—translucent 'Perspex', interlocking vynil sections and shallow plastic louvre.

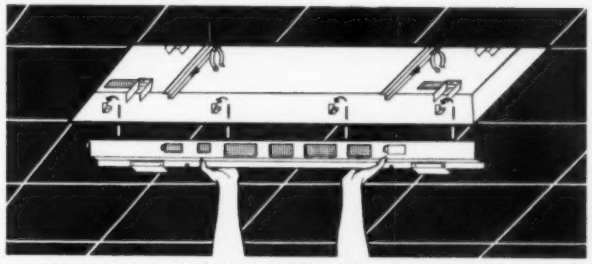
Atlas Lighting Ltd
Thorn House
Upper St. Martin's Lane
London WC2



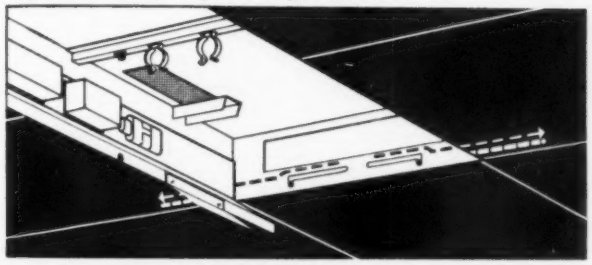
✳ lateral adjustment using special slotted plates (see small illustration) allows pre-wiring of ceiling



✳ vertical adjustment of slim 1" trim ensures perfect joint with ceiling

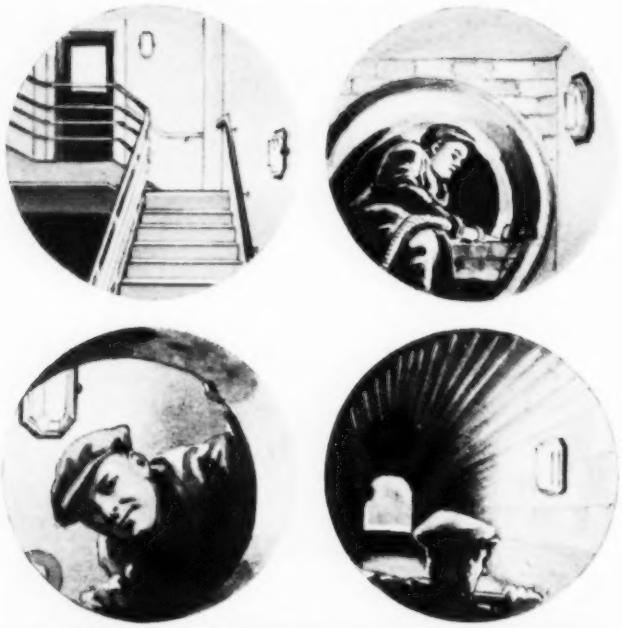


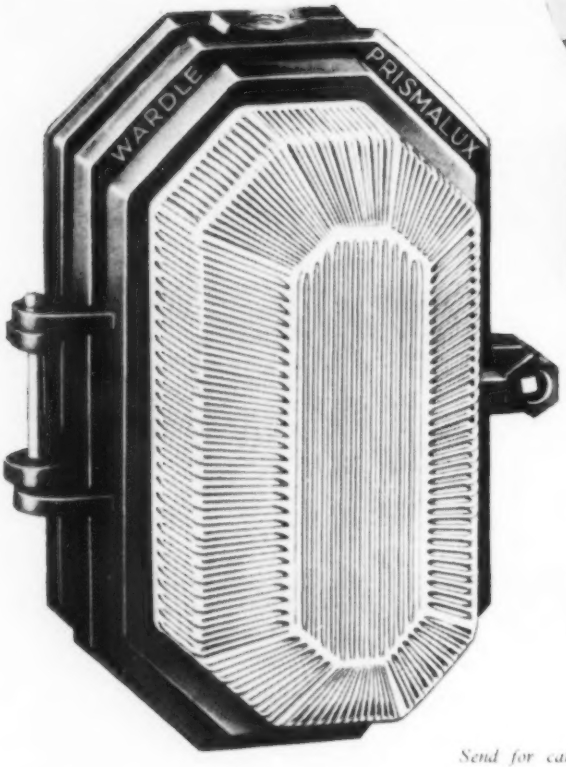
✳ control gear trays attached *after* installation allowing single-handed fitting—hinged for easy maintenance



✳ fits all types of ceiling and suspends from either true or false ceiling

DTV





PRISMALUX

DIRECTIONAL LIGHTING UNITS

take care of the dark spots.

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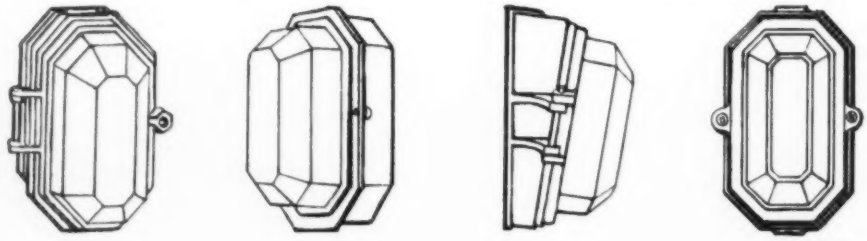

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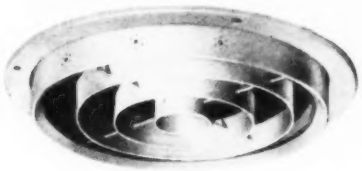

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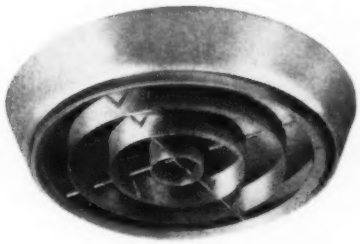
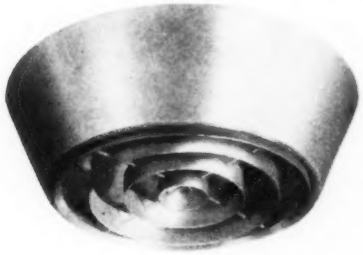
ceiling units





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AP 121

INDEX TO ADVERTISERS

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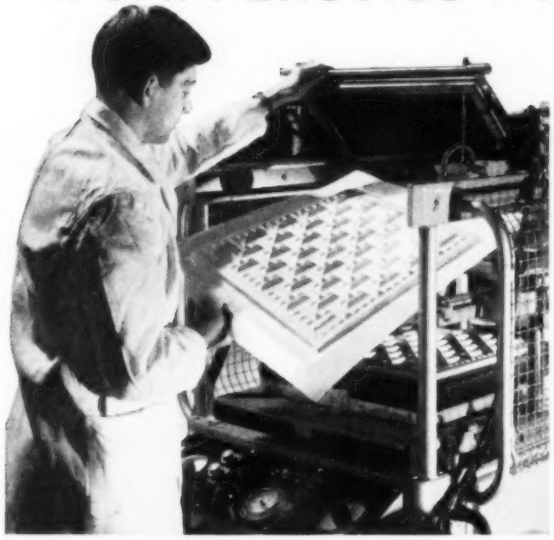

Vacuum forming panels in 'Flovic' vinyl copolymer sheet in the T.S. and D. Dept. Laboratories, I.C.I. Plastics Division.

'Flovic' translucent foil for luminous ceilings

Today many showrooms and similar establishments are lighted effectively by luminous ceilings.

'Flovic' translucent foil has been specially formulated for luminous ceilings. It is tough, free from the risk of discoloration, resistant to burning and optically efficient.

'FLOVIC'

'Flovic' is the registered trade mark for the vinyl copolymer foil manufactured by I.C.I.

This shows a 'Sylvalume' lighting system made by Atlas Lighting Ltd., installed in a Service Centre of the Merseyside and North Wales Electricity Board. This system, which gives a diffused light, incorporates 3′ x 3′ dishes vacuum-formed in 'Flovic' foil. Some of the dishes have a patterned finish and others a plain finish. An octagonal type diffuser is also available in this material.

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